



**Oakland 2045**

# **Oakland Safety Element**

**PUBLIC REVIEW DRAFT**

**March 2023**

**Prepared by:**

**DYETT & BHATIA**  
Urban and Regional Planners

**With Contributions From:**

Kittelson & Associates, Inc.  
Environmental Science Associates



# List of Figures

Figure SAF-1: Seismic Hazards .....2-4

Figure SAF-2: Landslide Hazards .....2-5

Figure SAF-3: Fire Hazards ..... 2-8

Figure SAF-4: Collaborative Fire Threat Management ..... 2-9

Figure SAF-5: Flood Hazards .....2-16

Figure SAF-6: Dam Breach Inundation Area .....2-18

Figure SAF-7: 100-year Coastal Flood + 0.5 ft SLR .....2-20

Figure SAF-8: Hazardous Materials and Sites, 2021 .....3-2

Figure SAF-9: Open Leaking Underground Storage Tanks .....3-4

Figure SAF-10: CalEnviroScreen based on DTSC Cleanup Sites ..... 3-5

Figure SAF-11: Airport Safety Compatibility Zones ..... 3-10

Figure SAF-12: Emergency Service Network ..... 4-2

Figure SAF-13a: Emergency Assessment, Primary and Secondary Routes ..... 4-6

Figure SAF-13b: Residential Areas with Less Than Two Access Points To  
Evacuation and Combined Hazard Zone .....4-9

Figure SAF-13c: Evacuation Scenario, Wildfire in Northern Hills (PM Peak Traffic) .....4-10

Figure SAF-13d: Evacuation Scenario, Wildfire in Northern Hills (Night) .....4-11

Figure SAF-13e: Evacuation Scenario, Wildfire in Central Hills (PM Peak Traffic) .... 4-12

Figure SAF-13f: Evacuation Scenario, Wildfire in Eastern Hills (PM Peak Traffic) .... 4-13

# List of Tables

Table SAF-1: Top 10th Percentile Tracts by Indicator — Climate Change Topic ..... 2-14

Table SAF-2: Hazardous Waste and Substances Cortese List Sites .....3-3

Table SAF-3 Top 10th Percentile Tracts by Indicator — Hazardous Materials .....3-6

Table SAF-4: DVP Grant Awards Fiscal Year 2022-2023..... 3-12

Table SAF-5: Public Air-Conditioned Facilities ..... 4-4

Table SAF-6: Summary of Roadway Congestion and Over-Capacity Conditions under  
Wildfire Scenarios in Evacuation Zones (2030) .....4-8

Table SAF-7: Police and Fire Station Capital Improvement Projects funded by  
Measure KK Infrastructure Bond .....4-14



# Executive Summary

The updated Safety Element of the City of Oakland's General Plan incorporates safety considerations into the planning and decision-making process by reducing potential short- and long-term risks of death, injuries, property damage, and economic dislocation resulting from fires, floods, droughts, earthquakes, landslides, and climate change; as well as local hazards associated with the workings of a major city.

California state law requires that each city and county adopt a general plan to guide its physical growth and development. A jurisdiction's general plan is its official policy document to create a blueprint for the future of the jurisdiction and guide its development. In California, all cities must adopt a general plan composed of at least seven elements, including the Safety Element.

All cities must also incorporate environmental justice into the General Plan. Oakland has chosen to adopt an Environmental Justice Element while also incorporating environmental justice goals into each element, including the Safety Element.

The Safety Element aims to protect residents, workers, and visitors from seismic and geologic hazards, fire hazards, hazardous materials, flooding, and other potential hazards that risk life and property. The Element also uses an equity lens through its hazards analysis and prioritizes vulnerable communities in the development of its goals, policies, and actions. The Safety Element aims to be rooted in an equity framework in accordance with the General Plan's Vision Statement and Guiding Principles.

The Safety Element builds on the City's 2021- 2026 Local Hazard Mitigation Plan; addresses all state requirements; and serves as a central reference point for the City's efforts to address safety and climate change issues, including earthquakes, floods, fires, toxic waste, and other hazards. The Safety Element includes overarching goals and policies to address natural hazards, fire and flood hazard management for critical facilities, non-conforming development to contemporary fire safe standards (e.g., road standards and vegetation hazards), emergency evacuation routes per SB 99, emergency evacuation, climate adaptation, sea level rise, drought, and identifies capital improvement programs to improve the City's resilience to natural and human-caused hazards.

The City's updated Safety Element contains five chapters: an introduction, three chapters dealing with specific environmental hazards which include natural hazards, human-made hazards, emergency preparedness and response, and implementation measures. In general, each chapter contains an overview of a specific hazard or issue; a summary of populations vulnerable to the hazard; an outline of the institutional framework, including relevant agencies, regulations, and programs; and a set of goals and policies specific to that hazard or issue. Implementing actions are included in the Chapter 5 table. Below are brief descriptions of the contents of each chapter:

- **Chapter 1, "Introduction,"** presents the background and purpose of the Safety Element, including statutory requirements. It also outlines the City of Oakland's process and community engagement efforts undertaken to develop the Element. Further, the chapter outlines the organization and goals of the Safety Element and considers the Element's relationship to other elements of the City's General Plan and guiding principles.

- **Chapter 2, “Natural Hazards,”** describes the risks from geologic and seismic hazards, fire, and flooding hazards in the City of Oakland. These hazards primarily include earthquake-induced surface rupture and ground shaking, liquefaction, land subsidence, and landslides; extreme weather events; wildfire and urban fire; and storm-induced flooding, dam failure, and sea level rise. Goals and policies for each natural hazard are presented in this chapter, while implementing actions are discussed in Chapter 5.
- **Chapter 3, “Human-made Hazards,”** outlines the risk from hazardous materials and other public safety hazards, including airport hazards and crime in Oakland. Hazardous materials include an overview of the city’s hazardous sites/ cleanup sites, underground storage tanks, and hazardous materials releases. Airport hazards consider land use incompatibilities with the surrounding areas. Other public safety issues addressed include systemic inequities that contribute to the underlying causes of crime and potential solutions to prevent crime through environmental design. Goals and policies are presented for human-made hazards in this chapter, while implementing actions are discussed in Chapter 5.
- **Chapter 4, “Emergency Preparedness and Response,”** analyzes the City of Oakland’s ability to respond to and facilitate an evacuation in the event of an emergency. The chapter provides an overview of the City’s existing emergency preparedness and response programs, agencies, and operations. It also provides information on Oakland’s emergency alert systems and evacuation routes, and describes current capital improvement needs relevant to emergency preparedness and response. Goals and policies for emergency preparedness and response are presented in this chapter, while implementing actions are discussed in Chapter 5.
- **Chapter 5, “Implementation Measures,”** provides a summary table of the goals, policies, and actions relevant to each of the hazard topics discussed in this Element.





# 1. Introduction

Oakland's prime location on the San Francisco Bay, sunny climate, and diverse geography contribute to its natural beauty, economic landscape, and quality of life. However, these same features also present risks to health and safety that the City must plan for proactively.

In the face of climate change and increasing risk of natural disasters and related hazards, the City of Oakland must mitigate safety hazards and be prepared for disasters in order to maintain a safe, enjoyable, and resilient community. Though many of these hazards will affect Oakland at a citywide scale, consequences of climate change and hazards will also be felt inequitably, meaning that under current conditions some groups will likely experience more harm than others. Thus, the City must also address systemic causes of racial and socioeconomic disparities to eliminate inequitable impacts that vulnerable communities face. This Element addresses the environmental hazards that affect the City and provides goals and policies to guide the City's response to these issues.

## 1.1 PURPOSE AND REQUIREMENTS

The City of Oakland is updating its General Plan, a visionary blueprint for the city's future over the next 20 years. The updated Safety Element presents a framework for minimizing risks posed by natural and human-caused hazards that may impact residents' health and welfare. This Element aims to protect residents, workers, and visitors from seismic and geologic hazards, fire hazards, hazardous materials, flooding, and other potential hazards that risk life and property. Other health-related issues, such as air quality, pollution burden, and environmental remediation are addressed in the Environmental Justice Element of the General Plan.

Topics addressed in this chapter include:

- Geologic and Seismic Hazards
- Hazards and Hazardous Materials
- Hydrology and Flooding
- Fire
- Climate Change
- Airport Hazards
- Public Safety
- Emergency Preparedness and Response

## STATUTORY REQUIREMENTS

State law under Government Code Section 65302(g) requires general plans to include a Safety Element to identify and address hazards for the protection of the community. In accordance with State law, this Element addresses seismic and geologic-related hazards, flood hazards, wildland and fire hazards, evacuation routes, and hazardous materials.

Passed in 2016, SB 379 requires that, beginning January 1, 2017, all cities and counties in California include climate adaptation and resiliency strategies in the Safety Element of their general plan as part of the general plan revision process. The climate adaptation update must include community goals, policies, and objectives informed by a climate change vulnerability assessment, as well as measures for addressing climate vulnerabilities. In accordance with State law, the City's Climate and Vulnerability Assessment presents findings and analysis on climate adaptation and resilience strategies and informs this Element's goals and policies.

## RACIAL EQUITY GOALS FOR THE CITY OF OAKLAND + PREVIOUS ONGOING EFFORTS

A guiding tenet of Oakland’s General Plan update is to advance the City’s mission to “intentionally integrate, on a Citywide basis, the principle of ‘fair and just’ in all the City does in order to achieve equitable opportunities for all people and communities.”<sup>1</sup> This means working to eliminate the root causes of inequity by understanding barriers to achieving greater equity and strengths of communities, and working with communities to develop solutions for long-term and systemic changes. That process begins by undertaking a full acknowledgment of the systemic racial inequities that have shaped the City of Oakland. A history of Oakland’s past land use planning and zoning decisions that have disproportionately harmed Oakland’s Black, Indigenous, People of Color (BIPOC) and low-income communities is found in the City’s Environmental Justice Element.

The City recognizes that determinants of equity are the drivers of achieving a fair and just society. Access to the determinants of equity is necessary to have equity for all people regardless of race, class, disability, gender, or language spoken. Inequities are created when barriers exist that prevent individuals and communities from accessing these conditions and reaching their full potential. While all components of equity are an important part of building community power and resilience, the determinants of equity as defined in the Oakland Municipal Code that are most specifically aligned with goals and policies in the Safety Element include:

- **Community and public safety** that includes services such as fire, police, emergency medical services and code enforcement that are responsive to all residents so that everyone feels safe to live, work and play in any neighborhood in Oakland;
- **Equity in City practices** that eliminates all forms of discrimination in City activities in order to provide fair treatment for all employees, contractors, clients, community partners, residents and others who interact with the City; and
- **Healthy built and natural environments** for all people that include mixes of land use that support jobs, housing, amenities, and services; trees and forest canopy; and clean air, water, soil, and sediment.

<sup>1</sup> Oakland Municipal Code Section 2.29.170.1

## Vulnerable Communities: Definitions

The Safety Element builds on the City’s ongoing efforts to achieve racial equity in Oakland. The Element’s goals and policies will prioritize **“frontline communities”**, or vulnerable communities that will be affected ‘first and worst’ from climate change and environmental hazard impacts. The Safety Element’s racial equity focus is based on the frameworks established by the City’s 2018 Oakland Equity Indicators Report, the 2020 Racial Equity Impact Assessment and Implementation Guide for the Oakland’s 2030 Equitable Climate Action Plan (ECAP), and other previous studies that have laid the foundation to ensure that the City integrates equity and social justice into its policies, practices, and actions.

“Frontline communities” face intersecting vulnerabilities, including racial discrimination, poverty, disability, housing insecurity, linguistic isolation, poor air quality, and more, which magnify climate threats. As a result, they are often the least able to adapt, resist, or recover from climate impacts. “Frontline communities” can change based on the specific threat or policy being considered. For example, vulnerable communities located on coastlines will be most severely impacted by sea level rise.

This Element uses the term **“vulnerable communities”**, and each section in this Element identifies what vulnerable groups are most affected by specific hazards, though there may be other groups also affected pending implementation of a specific policy or action.

**Environmental Justice (EJ) Communities** (referred to as “disadvantaged communities” in SB 1000) are low-income areas that are disproportionately impacted by environmental pollution and other hazards that can lead to adverse health effects. EJ Communities are eligible for special funding considerations, as well as targeted environmental justice efforts and investments. In Oakland, the most cumulatively burdened Environmental Justice Communities were defined using a robust screening analysis that analyzed both composite and individual scores of more than 50 indicators and other relevant factors. In other words, EJ Communities face the greatest cumulative burden from a variety of factors beyond safety.

*As applicable, sections in this Chapter include a list of Oakland neighborhoods (by census tract) that fall in the top decile for safety-related indicators. See the Environmental Justice Element and corresponding appendix for more information.*



## Mapping Vulnerable Communities

The Safety Element’s natural hazard maps also illustrate areas of highest social vulnerability in Oakland. Using the methodology developed by the Bay Conservation and Development Commission (BCDC), block groups labeled “Highest social vulnerability” have eight or more social vulnerability indicators with rates in the 70th percentile, relative to the Bay Area; and/or six or more social vulnerability indicators with rates in the 90th percentile, relative to the Bay Area.

Social Vulnerability indicators include:

- Renters
- Under 5 years old
- Very low income
- Non U.S. citizens
- Without a vehicle
- People with disabilities
- Single parent families
- Communities of Color
- 65 years old and older living alone
- Limited English proficiency
- Without a high school degree
- Severely housing cost burdened

By mapping and prioritizing vulnerable communities in the development of the Safety Element’s goals and policies, this Element aims to be rooted in an equity framework in accordance with the General Plan’s Vision Statement and Guiding Principles. Other frontline communities, including people in specific industries, people experiencing homelessness, and other groups may also be affected by specific hazards; however, these groups are not included in mapping, as census-level data is not available. Regardless, all policies in the Safety Element must consider the impacts to vulnerable individuals, and actions must address unique needs and build adaptive capacity accordingly.



## RELATIONSHIP TO LOCAL HAZARD MITIGATION PLAN

Under the Disaster Mitigation Act of 2000, the Federal Emergency Management Agency (FEMA) requires a hazard mitigation plan when applying for certain types of non-emergency disaster assistance. Hazard mitigation plans must be updated and re-submitted for FEMA approval every five years to maintain eligibility for funds. The Local Hazard Mitigation Plan supplements the Safety Element of the General Plan to provide specific insight into hazards that the city faces along with strategies for mitigation. The current City of Oakland 2021 – 2026 Local Hazard Mitigation Plan (LHMP) is an update of the previous hazard mitigation plan the City adopted in 2016. Government Code Section 65302(g)(4) required that this updated version of the Local Hazard Mitigation Plan contain a vulnerability assessment that identifies the risks that climate change poses to the local jurisdiction, including climate adaptation and resiliency strategies.

The 2021 – 2026 LHMP establishes and promotes a comprehensive hazard mitigation strategy and efforts to protect the whole community and environment from identified natural and human-made hazards. The 2021 – 2026 LHMP provides a list of actions that may assist the City in reducing risk and preventing loss from future hazard events, as well as critical facilities (facilities and infrastructure that are critical to the health and welfare of the population) to increase preparedness. The action items address multi-hazard issues, as well as mitigation for hazards that include

earthquake, landslide, severe weather, wildfire, sea level rise, dam failure, flood, tsunami, and drought. While the Safety Element of the General Plan provides an overview of the environmental and human-made hazards that affect Oakland, the Local Hazard Mitigation Plan provides greater analysis, context, and mitigation strategies for these hazards.

## RELATIONSHIP TO CLIMATE CHANGE VULNERABILITY ASSESSMENT

The Climate Change Vulnerability Assessment (‘Assessment’) for the City of Oakland was released in March 2023. The purpose of this Assessment is to assist the City and the community in identifying and summarizing climate change hazards and risk, and to inform policies for the Safety, Environmental Justice, Land Use and Transportation, and other pertinent General Plan elements and may serve as reference for additional community engagement. The Assessment highlights specific locations and communities most likely to be severely impacted by wildfires, sea level rise and flooding, and temperature increases. California Senate Bill (SB) 379 (2022) Government Code section 65302 requires all cities and counties in California to address climate adaptation and resiliency in their general plans.

The Assessment synthesizes climate change projections created by Cal-Adapt, historical data pertaining to natural events and hazards, and socio-demographic data to determine which climate impacts are most likely to affect the city, where these

impacts may manifest, who will be affected, and how severely. The Assessment also considers existing and planned development in identified at-risk areas, including structures, roads, utilities, and essential public facilities, and identifies the federal, state, regional, and local agencies responsible for the provision of public health, safety, transportation, and environmental services, including special districts and local offices of emergency services.

## RELATIONSHIP TO OAKLAND'S GENERAL PLAN ELEMENTS

Based on timing requirements specified by State law, the Housing, Environmental Justice, and Safety elements are being updated concurrently during the first phase of the General Plan update.

The Safety Element is also closely related to the other General Plan Elements, particularly the Environmental Justice and Housing Elements. In recognition of the connections between environmental justice topics, such as hazardous materials, the Safety Element also addresses hazards as they relate to environmental justice and integrates these concepts into its policies, goals, and actions. For example, the Safety Element includes policies that require the City to review new proposed facilities with consideration for proximity to residential development and Environmental Justice Communities where pollution overburden already exists.

Further, the Housing Element presents the City of Oakland's strategy and commitment for how it will meet the housing needs of the community. The Element aims to make quality housing opportunities available to all Oakland residents and address systemic housing inequity. The Safety Element aims to protect residents, workers, and visitors from hazards. As such, policies, goals, and actions in the Safety Element also help to protect housing from impacts of environmental and human-made hazards. For example, policies in the Safety Element require geotechnical analysis of development in geologic or seismic hazard zones, or stringent design and building requirements for housing in Very High Fire Hazard Severity Zones.

## PROCESS AND COMMUNITY ENGAGEMENT

Community engagement included a range of activities intended to meet people where they are. In many instances, community members shared their firsthand knowledge of environmental issues in their neighborhoods, as well as existing community-led efforts and strategies to address these issues. Engagement activities included:

- **Focus groups.** The City conducted three focus groups on safety issues with various organizations involved in public safety, climate change, and resilience issues. The three focus group topics were on 1) general Safety Element topic requirements and background; 2) climate change and resilience; and 3) addressing perception of safety in the built environment, as well as the social determinants of creating a safe environment, such as housing, employment, and other issues that the General Plan could address.
- **Cultural events and pop-ups.** Since November 2021 to March 2023, the General Plan Update (GPU) Deeply Rooted Collaborative has conducted pop-up events in Eastmont, Fruitvale, San Antonio, Chinatown, West Oakland, and Downtown. For example, in West Oakland these events have been porchside chats and a pop-up at Hoover Elementary. Engagement has also been integrated into larger community events like the Oakland Asian Cultural Center's (OACC) Asian Pacific New Year Celebration and the Black Joy Parade. At these community-embedded events, the team has engaged with thousands of people, with a majority being individuals from communities of color. These events sought to hear community concerns, ideas and solutions through interviews and focus group conversations.
- **Technical Advisory Committee.** The Technical Advisory Committee (TAC) is comprised of internal City department representatives as well as other Oakland-based, neighboring, and regional governmental agency representatives. The TAC serves to advise on key strategies to address Oakland's big issues related to housing, environmental justice, safety, and other topics; review community input collected at key points in the process; and inform, discuss, and provide technical direction on policies and actions.

- **Stakeholder interviews.** At eight discussion groups held in May 2022, representatives from over 50 agencies, businesses, and community groups participated in small group discussions with project staff. At the Environmental Justice and Conservation discussion, participants emphasized youth participation and community-led climate action programs. Others described community health issues related to urban heat and stormwater runoff filtration.
- **Neighborhood Councils.** City staff are working with Neighborhood Service Coordinators to present at Neighborhood Crime Prevention Councils (NCPCs) on topics including housing, environmental justice, industrial lands and safety and natural hazards and receive feedback.

Some of the key themes from community outreach included the following:

- **Community Leadership and Planning.** Many community members highlighted community stewardship and leadership as a tool for climate and disaster resilience. Several existing organizations are already working with frontline communities to produce solutions to climate change and disaster preparedness. The City should leverage this existing work and partner to support these organizations as they implement community-driven solutions.
- **Importance of Green Infrastructure.** Green infrastructure was one of the most frequently mentioned strategies to address climate change, improve air quality, and bolster public health. Community members favored nature-based adaptation strategies to protect against sea level rise, urban flooding, and urban heat. Community members also noted that urban greening and green infrastructure projects were frequently included in existing community plans, including the East Oakland Neighborhoods Initiative and the West Oakland Community Action Plan. Oakland staff indicated that finding funding for green infrastructure was a challenge, but that it could be included in tandem with complete streets or other street improvement projects.
- **Equitable response.** Community members were interested in developing a preemptive emergency response training

that reaches more diverse audiences. Climate hazards and disaster-related emergencies disproportionately affect people with disabilities, low-income people, people of color, and houseless individuals. Decisions made related to disaster risk and response should be examined with this lens, and coordination with community groups on education, outreach, training exercise, and strategies is the best way to make emergency preparedness accessible.

- **Public Safety.** The issue of public safety and preventing violence was another major issue voiced by the community. Community members discussed improving and expanding community spaces as well as improving cleanliness across the city as a critical factor in increasing feelings of safety. Many felt that certain places in Oakland lacked sufficient and accessible community spaces such as parks, local businesses, recreation centers, libraries, and churches, which contributes to a lack of vibrancy and human presence in Oakland. They felt that formalizing informal gathering spaces would be a useful tool to create safety by building community. Community members also shared that observations of trash and illegal dumping can inhibit community pride. Suggested strategies from community included increased pedestrian and bicycle safety; geographically equitable investments in community facilities, such as childcare, community centers/restorative justice centers, and gathering places; and land uses/urban design that create an active and welcoming streetscape. Many of these policies are included in the Environmental Justice Element.

### CONNECTION TO VISION AND GUIDING PRINCIPLES

The Safety Element seeks to address and mitigate hazards that can affect the health and safety of the community. The purpose of this Element ties closely in with the following portions of the General Plan's Vision Statement:

**We are housed, healthy, and safe.** *Oakland has high-quality accessible housing for everyone who needs it, and each person is housed with dignity. Every neighborhood, home, school, and park has clean air and fresh water, and Oakland's children breathe that fresh, clean air as they run, play, and grow. Cool shade from mature trees, scents of flowers, and sounds of birds chirping and bees buzzing enrich lush residential areas. The city's many grocery stores, farmer's markets, and garden farmstands offer fresh, healthy food to nurture tables and bodies in all different cultural traditions. Oakland's homes and communities have healed from historic violence, and crime-free, clean streets and public spaces are safe for people to walk and linger.*

**We are interconnected.** *Oakland is a center for sustainable living, where each neighborhood is connected to every other neighborhood through safe, easy, low-carbon transportation options. People of all ages and abilities can walk, bike, or roll along streets that are safe, welcoming, and well-maintained, and residents can take buses and shuttles with ease and take advantage of expanding regional transit options. Designated truck routes keep noisy vehicles out of neighborhoods, and residents are proud of the city's clean, low speed*

*streets lined with local businesses and abundant trees. The prevalence of walking, biking, and transit helps Oakland meet its climate goals, and strong neighborhood networks ensure that residents are equipped to handle and recover from natural and human-caused challenges as they arise.*

The Safety Element also most closely furthers the following General Plan Guiding Principles:

*Each of these guiding principles is rooted in an equity framework that should work through the Plan's policies to reduce disparities and promote more equitable outcomes, especially for racial equity. Please see the accompanying racial equity framework for more information.*

**We are housed, healthy, and safe.**

- Ensure that every home, neighborhood, school, and park has clean air, water, and land.
- End community violence and crime through a collaborative and community-led public health approach to violence and healing.

**We are interconnected.**

- Proactively plan for resilience, quick response, and equitable recovery from sea level rise, wildfires, severe drought, extreme weather and heat, and other climate-change challenges.

This page intentionally left blank.



## 2. Natural Hazards

Like many California communities, Oakland faces numerous natural hazards, including geologic and seismic hazards, fire, flooding, and sea level rise. This section defines and describes each of these natural hazards in Oakland and highlights where communities are disproportionately vulnerable to their impacts.

### 2.1 GEOLOGIC AND SEISMIC HAZARDS

#### TOPOGRAPHY AND SOILS

Oakland sits at the intersection of two plates of the earth's crust. Within the last five million years, the faulting and folding of earthquake plates uplifted the present Oakland Hills and created what is now the San Francisco Bay, while erosion and sedimentation from the San Joaquin/Sacramento Delta have created the broad alluvial plain on which most of Oakland lies.

Oakland's topography falls into two broad categories: The lowlands (or flatlands), which include the flat coastal land surrounding the bay, tidal flats, and the more gently sloped inland land, and the uplands (or the hills). The city's topography rises from an elevation of sea level at its western edge to approximately 1,760 feet in the northeast Oakland Hills. Slopes are generally steeper

in the hills, with areas in the Oakland Hills, especially areas east of Highway 13/I-580, exceeding slopes of 30 percent. Significant portions of neighborhoods northeast of Lake Merritt, such as Grand Lake, as well as Hills-adjacent parts of East Oakland have slopes exceeding 15 percent. The terrain flattens out toward the western and southwestern parts of the city as well as north of I-980; these relatively flat areas include Downtown, West Oakland, most of North Oakland, the Port and Airport, and most of East Oakland.

Several soil types occur within Oakland with varied qualities that affect how fast it erodes, its absorbency, how it behaves in an earthquake, how it reacts to metals (known as corrosivity), and other factors. The three primary soil types in Oakland are the bay muds located along the shoreline and in the landfilled areas; the alluvium and dune-sand deposits in the flatland and lower hill areas; and the sandstones and shale fragments of the upper hill areas. Bay mud consists of fine-grained, unconsolidated sand, silt, and clay with abundant organic material; over time, bay muds near the original shoreline have been overlain with artificial fill, typically consisting of mixed material such as rock and other debris. Soils in the flatlands have been formed by thousands of years of hillside erosion and are characterized by high corrosivity and low erosion potential. Finally, soils in the upper hills are composed of sandstone and shale materials, while soils in the lower hills consist of variable soils deposited through erosion, landsliding and artificial cutting and filling.<sup>1</sup>

<sup>1</sup> City of Oakland, 2004. City of Oakland General Plan, Safety Element. Available online: <https://www.oaklandca.gov/resources/safety-element>

#### TYPES OF SEISMIC HAZARDS

There are various hazards associated with an earthquake. **Surface rupture** occurs when the ground surface is broken due to fault movement during an earthquake, and usually occurs along an active or potentially active fault trace.

- **Fault creep** is the slow, constant slippage that can occur on active faults absent an earthquake. Surface rupture may occur suddenly during an earthquake or slowly in the form of fault creep. Examples of fault creep are well known along the Hayward Fault where it crosses highly developed areas in Alameda County.<sup>2</sup> This slow surface creep offsets and deforms curbs, streets, buildings, and other structures that lie near the fault.

**Ground shaking** generally refers to all aspects of motion of the earth's surface resulting from an earthquake and is often the primary cause of damage from seismic events. The extent of ground shaking depends on the magnitude and intensity of the earthquake, distance from the rupture (e.g., epicenter), and local geologic conditions.

- *Intensity* is a subjective measure of the perceptible effects of seismic energy at a given point, commonly measured by the Modified Mercalli Intensity Scale (MMI). This scale reports the

<sup>2</sup> Alquist-Priolo Earthquake Fault Zones, 2019, California Department of Conservation (<https://www.conservation.ca.gov/cgs/alquist-priolo>)

intensity of shaking on a 10-tiered scale from “not felt except by a few under especially favorable circumstances” (I, or low), to “some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent”

- *Magnitude* is an objective measure of an earthquake's size at its release, typically reported by the moment magnitude (MW) scale, which looks at the distance a fault moves and the force required to move it.

**Liquefaction** occurs when loose, saturated, granular soil, usually found near the ground surface, is temporarily transformed from a solid to a liquefied state as a result of seismic ground shaking, or other rapid loading, causing the soil to lose strength and lose its ability to support structures. Additionally, liquefied soil exerts higher pressure on retaining walls causing them to tilt or slide and can trigger landslides.

- According to the 2021 – 2026 Local Hazard Mitigation Plan, sections of Oakland's shoreline, such as the Port of Oakland and the Oakland International Airport, are increasingly vulnerable to liquefaction during seismic events due to the abundance of loose, saturated, and granular soil types.

**Land subsidence** is a gradual settling or sudden sinking of the Earth's surface due to removal or displacement of subsurface earth materials. The principal causes include aquifer-system compaction associated with groundwater withdrawals, drainage of organic soils, underground mining, natural compaction, or collapse, such as with sinkholes or thawing permafrost. Subsidence can also be caused by natural events such as earthquakes.

- Subsidence occurs around the banks of the San Francisco Bay, impacting Oakland's coastline. This subsidence is largely influenced by the tectonics of the region as well as by sediment compaction of the landfill and Bay Mud deposits that comprise much of the soil in the area. Subsidence occurs with rates exceeding five millimeters per year in the San Francisco Bay Area.<sup>3</sup>

<sup>3</sup> Blackwell, Em, Manoochehr Shirzaei, Chandrakanta Ojha, and Susanna Werth. 2020. "Tracking California's Sinking Coast From Space: Implications For Relative Sea-Level Rise." *Science Advances* 6(31):eaba4551. Retrieved from <https://advances.sciencemag.org>

**Landslides** and mudslides generally have the potential to occur on most sloped land. The risks tend to be greatest where a number of contributing factors are present, including slopes over 15 percent; weak, unconsolidated, or shallow soils; water saturation; a history of landslides; active earthquake faults; and extensive grading or vegetation removal (from fires or development activity). The slide itself is usually triggered by an earthquake, heavy rain, or misdirected runoff.

- Slopes at the greatest risk for landslides in the city are concentrated throughout the Oakland Hills (especially in the northern hills) and within two miles south of Highway 13.
- The landslide hazard in the Oakland Hills is exacerbated by the fact that the area is situated near the Hayward fault. During a major earthquake on that fault, landslides may occur in the hills in response to strong ground movements anticipated to occur in the area. Landslides could block roads, which would hamper evacuation, firefighting, and relief operations within the area. While efforts have been taken by the City through the development process to minimize landslide potential, most hillside development predates the imposition of grading and related requirements. For this reason, older hillside homes and subdivisions are the most susceptible to damage from landslides.



## GEOLOGIC AND SEISMIC HAZARDS

Oakland is located between two known active fault zones – Hayward and San Andreas. The Hayward Fault Zone extends north-northwest to south-southeast approximately 55 miles from San Jose to Point Pinole along the eastern side of Oakland, as shown on **Figure SAF-1**. The fault is active, producing large earthquakes historically, and is designated as an Alquist-Priolo Earthquake Fault Zone (EFZ).<sup>4,5</sup> The San Andreas Fault Zone is a system of faults trending northwest for approximately 600 miles, from the Gulf of California to Cape Mendocino. It also has been designated an EFZ. There have been numerous large and destructive earthquakes generated from the San Andreas Fault Zone, including the 1906 San Francisco earthquake and the 1989 Loma Prieta earthquake. The Working Group on California Earthquake Probabilities has estimated that the entire San Francisco Bay Area has a 72 percent chance of experiencing an earthquake of magnitude 6.7 or higher over the next 30 years, with the Hayward and San Andreas faults being the most likely to cause such an event.

Strong seismic ground shaking and earthquake induced liquefaction and/or landslides are the primary geologic hazards of concern in Oakland in the event of an earthquake. The Probabilistic Seismic Hazard Assessment reveals that most of Oakland is at risk for violent shaking, while part of the Port, including Oakland International Airport, is at risk for severe shaking.<sup>6</sup> Other earthquake ground shaking scenarios are modeled in the City's Hazard Mapper, which shows groundshaking risk for earthquakes that may occur at the Calaveras, Hayward, and San Andreas fault zones.<sup>7</sup> Liquefaction is the rapid loss of shear strength experi-

<sup>4</sup> In accordance with the Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) of 1972, the State Geologist established regulatory zones, called “Earthquake Fault Zones,” around the surface traces of active faults and published maps showing the earthquake fault zones. Within the fault zones, buildings for human occupancy cannot be constructed across the surface trace of active faults.

<sup>5</sup> Working Group on California Earthquake Probabilities, 2015a. Long-Term Time-Dependent Probabilities for the Third Uniform California Earthquake Rupture Forecast (UCERF3). *Bulletin of the Seismological Society of America*, Vol. 105, No. 2A, pp. 511-543. April 2015. doi: 10.1785/0120140093

<sup>6</sup> Ibid.

<sup>7</sup> The City of Oakland Hazard Mapper. Available at <https://oakgis.maps.arcgis.com/apps/MapSeries/index.html?appid=f84855cfff9b464c94aa6fc44bd660c3>. Accessed Feb 2023.

enced in saturated soils below groundwater level during strong earthquake shaking. Liquefaction can move blocks of soil, placing strain on buried pipelines that can lead to leaks or pipe failure. Liquefaction susceptibility is generally highest in the low-lying coastal areas of Oakland, and around Lake Merritt and the Channel that connects it to the Estuary (Figure SAF-1). Earthquake-induced landslides are a particular type of landslide in which rocks and soil are displaced due to strong ground shaking. Figure SAF-2 also shows that landslides are most likely in the hillier parts of Oakland.

The degree of damage caused by an earthquake depends on an area’s geologic composition, the number of people and the designated land uses, the prevailing construction standards, the prevalence and condition of gas lines, the condition of water and sewer main lines, the efficiency of the emergency-response system, and even the time of day and day of the week. Most of Oakland’s geologic and seismic threat comes from impacts to City utility lifelines, quake-related fire, landslide, or flood, and impacts to structures or buildings, which can include partial or total collapse. The potential for structural hazards largely depends on the structure’s design and construction type. While modern building codes require seismic study, safety measures, and earthquake-resistant design to help protect communities against structural hazards, many buildings in Oakland were built before these codes were in place.

While it is impossible to prevent earthquakes, the loss and damage resulting from their impacts can be minimized through proper design and construction of structures, public infrastructure, and land use development. Geological investigations and greater oversight of engineering practices and construction techniques will continue to remain essential elements of the development process, and the safety of existing buildings must be upgraded whenever possible. The City’s building electrification plan, as outlined in the 2030 ECAP, will not only drive long-term building energy efficiency improvements but also enhance infrastructure safety during earthquakes. The ECAP proposes a two stage process: in stage 1, new developments will no longer incorporate gas connections, and in stage 2, existing buildings will stop using gas. This will allow the City to gradually decommission parts of the gas pipeline system, reducing the risk of gas main ruptures during earthquakes.

**SOCIAL VULNERABILITY**

Based on the location of hazards and vulnerable communities illustrated in the figures, higher-income residents and white residents who make up the majority of the population in census tracts along the city’s northern edge in the hills are more likely to be at risk of landslides and ground shaking, while lower-income areas and communities of color are more likely to be affected by moderate susceptibility to liquefaction (the highest liquefaction risks are along the shoreline in industrial areas and in the Jack London and Brooklyn Basin areas). From Mid-60th Avenue along the Hegenberger corridor past 98th Avenue and West Oakland along West Grand Avenue, East Oakland is also vulnerable and contains a large percentage of households of color, who are often already more burdened by housing costs than white households. Due to the large-scale nature of seismic events, however, the entirety of Oakland is generally at risk of geologic hazards. Goals and policies developed by the City will work to mitigate these geologic and seismic hazards while prioritizing adaptation for socially vulnerable groups through compliance with state laws, geotechnical regulations, and local policies and programs.

**INSTITUTIONAL AND REGULATORY FRAMEWORK**

Following the devastation of the San Fernando earthquake in 1971 (magnitude 6.6), California created the Alquist-Priolo Act to reduce damage and losses from surface fault rupture. This act established regulatory zones surrounding the surface traces of active faults in California so that a structure for human occupancy cannot be placed or built on active faults with potential for surface rupture and must be sited at a minimum distance from the fault.<sup>8</sup>

Established in 1990, Seismic Hazards Mapping Act (SHMA) directs the Department of Conservation, California Geological Survey to identify and map areas prone to earthquake hazards of liquefaction, earthquake-induced landslides, and amplified ground shaking. The purpose of the SHMA is to reduce the threat to public safety and to minimize the loss of life and property by identifying and mitigating these seismic hazards. The SHMA requires the

State Geologist to establish regulatory zones and to issue appropriate seismic hazard zone maps to all affected cities, counties, and state agencies for their use in planning and controlling construction and development.<sup>9</sup>

While an earthquake fault zone generally prohibits location of structures for human occupancy within 50 feet of a trace of an active fault line, the State may grant exceptions for development within an earthquake fault zone if a geologic investigation approved by the State Geologist shows that the structure is not situated upon a trace of an active fault line.<sup>10</sup>

To further address earthquake hazards, and pursuant to Oakland Municipal Code Chapter 15.20, the City of Oakland applies Standard Conditions of Approval to all projects that involve new structures, major additions, and subdivisions located in an Earthquake Fault Zone per the State Alquist-Priolo Fault Zoning Act and in a seismic hazard zone per the State Seismic Hazards Mapping Act.

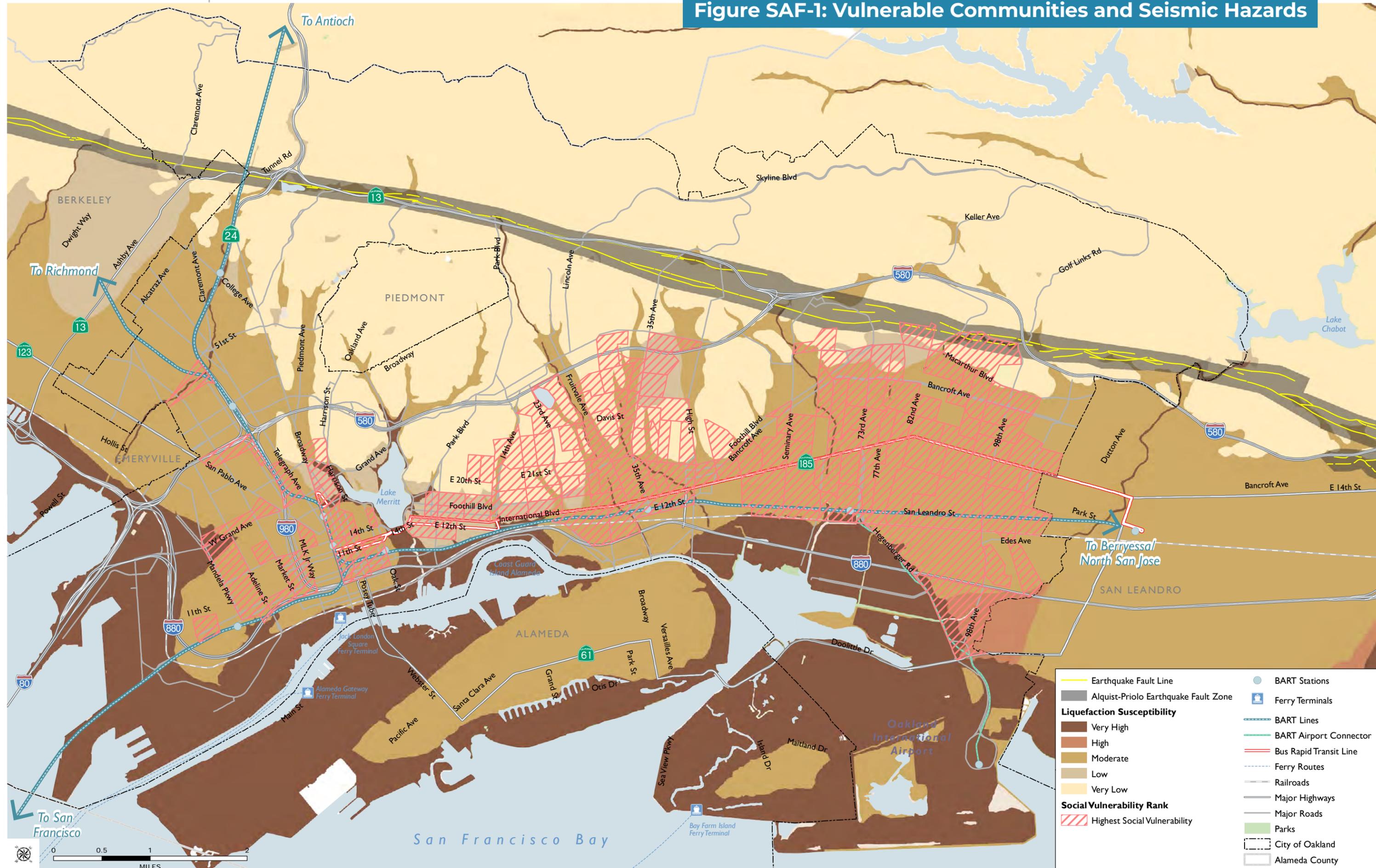
The City of Oakland’s Soft Story Retrofit Program also works to save lives by strengthening buildings with large ground-floor openings or weak stories that are particularly prone to collapse during an earthquake. Effective January 22, 2019, Municipal Ordinance No. 13516 requires residential property owners of subject buildings to strengthen these vulnerable buildings with seismic retrofits. Actions in the Safety Element (found in Chapter 5) direct study and evaluation of other types of buildings that may be at risk, including those made of non-ductile (or inflexible) concrete. Use of this material was one of the factors associated with rampant building collapse caused by the February 2023 earthquakes in Turkey.

<sup>9</sup> Public Resources Code, Chapter 7.8, Section 2690-2699.6

<sup>10</sup> Public Resources Code, section 2621.7

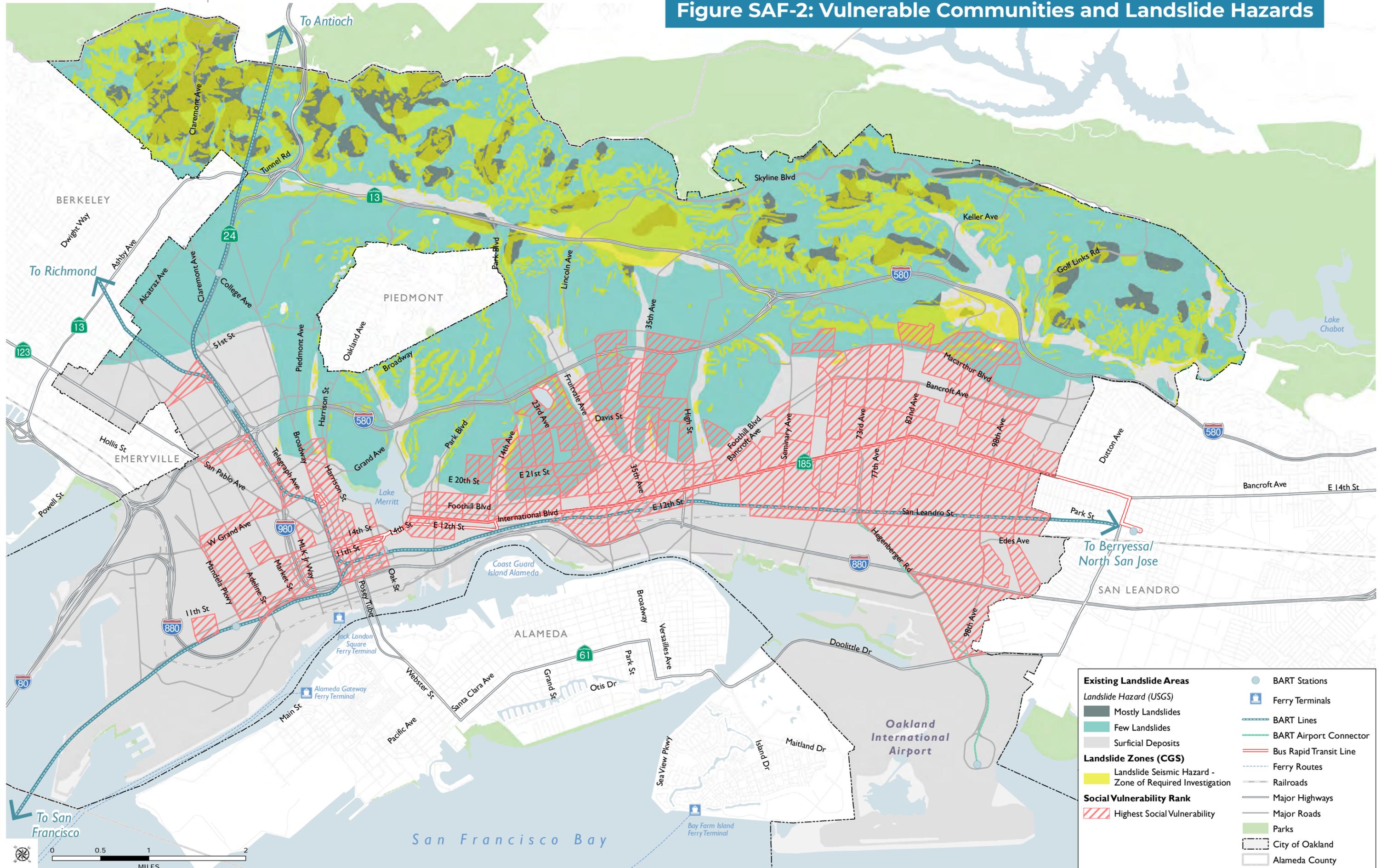
<sup>8</sup> Alquist-Priolo Earthquake Fault Zones, 2019, California Department of Conservation (<https://www.conservation.ca.gov/cgs/alquist-priolo>)

Figure SAF-1: Vulnerable Communities and Seismic Hazards



SOURCE: ESA, 2022; BCDC, 2020; City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2021

**Figure SAF-2: Vulnerable Communities and Landslide Hazards**



<b>Existing Landslide Areas</b>	● BART Stations
<b>Landslide Hazard (USGS)</b>	🚢 Ferry Terminals
■ Mostly Landslides	— BART Lines
■ Few Landslides	— BART Airport Connector
■ Surficial Deposits	— Bus Rapid Transit Line
<b>Landslide Zones (CGS)</b>	— Ferry Routes
■ Landslide Seismic Hazard - Zone of Required Investigation	— Railroads
<b>Social Vulnerability Rank</b>	— Major Highways
▨ Highest Social Vulnerability	— Major Roads
	■ Parks
	⬜ City of Oakland
	⬜ Alameda County



SOURCE: BCDC, 2020; CGS Information Warehouse, Department of Conservation, data accessed 2022; MTC/ABAG Hazard Viewer, data accessed 2021; City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2022

## GOALS AND POLICIES

### GOAL SAF-1: MINIMIZE THE RISK TO LIFE AND PROPERTY CAUSED BY SEISMIC AND GEOLOGIC HAZARDS.

- SAF-1.1 Seismic Hazards.** Develop and continue to enforce and carry out regulations and programs to reduce seismic hazards and hazards from seismically triggered phenomena. Prioritize programs in areas of highest seismic risk and seismic vulnerability.
- SAF-1.2 Structural Hazards.** Continue, enhance, or develop regulations and programs designed to minimize seismically related structural hazards from new and existing buildings.
- SAF-1.3 Limit Development in Hazardous Areas and Minimize Erosion.** Minimize threat to structures and humans by limiting development in areas subject to landslides or other geologic threat and undertake efforts to limit erosion from new development.
- SAF-1.4 Seismic Hazard Coordination.** Work with other public agencies to reduce potential damage from earthquakes to “lifeline” utility, economic, and transportation systems, including Caltrans; BART; PG&E, EBMUD, and other utilities providers; the Port of Oakland; and others.



## 2.2 FIRE

### WILDFIRE/WILDFIRE URBAN INTERFACE

As climate change exacerbates drought conditions in California, wildfire threats have become increasingly common. A wildfire is any uncontrolled fire on undeveloped land that requires fire suppression. According to the City of Oakland 2021 – 2026 Local Hazard Mitigation Plan, wildfires are common in the Bay Area, with large historic wildfires recorded in 1961, 1962, 1964, 1965, 1970, 1981, 1985, 1988, and 1991. Between 1954 and 2020, FEMA issued major disaster (DR), emergency (EM) and fire management assistance declarations for two fire hazard-related events in Alameda County. The 1991 Oakland Hills Fire (Tunnel Fire) killed 25 people, injured 150 others, burned 1,520 acres, destroyed thousands of homes, and caused \$1.7 billion in losses. The high winds, steep terrain, and heavy fuel load made fighting this historic wildfire a major challenge. Major wildfires that occur outside the city still have profound impacts on economies, health, and ecosystem function throughout the region.

State law requires the California Department of Forestry and Fire Protection (CAL FIRE), to identify areas, or zones, of very high fire hazard severity potential under the Fire and Resources Assessment Program (FRAP). These Fire Hazard Severity Zones (FHSZ) are mapped and identified based on expected burn probabilities, potential fuels over a 30- to 50-year time period, and their correlated expected fire behavior, in order to better predict possible vegetation fire exposure to buildings and developments. As shown in **Figure SAF-3**, the eastern portion of the city in the Oakland Hills is designated as a Very High Fire Hazard Severity Zone (VHFHSZ) and a Local Responsibility Area (LRA), where local governments have fiscal responsibility for wildfire protection. This portion of the city is adjacent to State Responsibility Areas (SRAs), where the State has responsibility for wildfire protection, also designated as VHFHSZ. Approximately 10,800 acres of land in Oakland are designated as VHFHSZ, representing approximately 22 percent of land area in City limits. This is the largest VHFHSZ by acreage within a Bay Area city boundary. CAL FIRE is currently updating these maps to reflect climate change and wind activity patterns, with likely expanded areas designated at higher tiers of wildfire threat.

Additionally, the Oakland Hills area is largely defined as part of the wildland-urban interface (WUI). The WUI is an area where structures and other human development meets or intermingles with undeveloped wildlands. This designation is based on the fuel load, weather and terrain factors that influence fire likelihood and fire behavior. The mapped WUI includes these areas mapped as VHFHSZ and includes additional land area further west in the more developed areas of the city. While many of the fires in the WUI are small and can be controlled, the proximity of dense residential communities to areas that are fire-prone increases the hazard of wildfire in Oakland. Larger fires in this ecosystem should be anticipated every 10-20 years.<sup>11</sup> Wildfire in the urban interface is a growing concern in the Bay Area. In the past 60 years, the region has experienced over 500 wildfires which have threatened public safety, property, infrastructure, air quality, water quality, and natural environments.<sup>12</sup>

A significant number of structures are vulnerable to wildfire in the City. As of 2008, California State Building code requires minimum standards be met for new buildings in fire hazard severity zones. Most housing in the city—84 percent—was built prior to this code requirement (U.S. Census, 2020). It is unknown how many of these structures are in fire hazard zones, though the 2021-2026 LHMP estimates that 13 percent of Oaklanders (over 15,000 homes) reside in either a high or very-high wildfire severity zone. Any proposed development in the VHFHSZ must comply with state and city requirements for building standards, vegetation management, points of egress, and other measures, as well as other policies included in this Element. As described in the LHMP, an estimated 35 percent of the critical facilities in the city are located in wildfire risk areas, with many of these facilities believed to be wood-frame. Because these facilities could have a significant amount of functional downtime after a wildfire, both mitigation and operations planning continuity will be necessary to develop procedures for providing services under circumstances where access to critical facilities is limited.

<sup>11</sup> City of Oakland, 2017. City of Oakland General Plan Update, Safety Element. Available online: <https://www.oaklandca.gov/resources/safety-element>

<sup>12</sup> Association of Bay Area Governments (ABAG), 2021. Wildfires. Available online: <https://abag.ca.gov/our-work/resilience/data-re-search/wildfire#:~:text=Wildfire%20Risk%20and%20Resources,destroyed%20more%20than%208%2C000%20structures.>

Further, tree mortality in the WUI increases the level of dead wood that can act as fuel. Increased fuel loading due to tree mortality increases the level of fire hazard for adjacent communities.<sup>13</sup> Climate change also compounds threat, as increased temperature and more frequent drought stress trees and speed up tree deaths, but also can result in less water storage in soils, reduced biomass in soils, and extended periods of dry grasses. All of these expand the risk of both fire ignition and severity. The California Public Utilities Commission (CPUC) maps these high fire-threat areas where there is a higher risk for power line fires igniting and spreading rapidly. As shown on **Figure SAF-4**, tree die-back in East Bay Regional Parks (e.g., Reinhardt, Anthony Chabot) puts adjacent areas of Oakland at risk for wildfire impacts, including secondary impacts of air and water pollution, erosion, and landslides.

**URBAN FIRE**

An urban fire is a fire that can rapidly spread to adjoining structures and damage or destroy large commercial buildings, apartment complexes, and other residential or commercial facilities. As described previously, much of the fire hazard that Oakland faces is due to the proximity of dense, residential communities and urban areas to areas with high fire risk due to steep slopes, vegetation that can act as fuel for fires, and seasonal winds which can spread fire. The primary factors affecting the risk of structural fire are the age and condition of the building or structure, its proximity to other structures, and the methods and materials used in its construction. As the City grows and development becomes denser, the possibility of urban fires increases.

Urban fires usually result from sources within buildings themselves, though recently the region has also observed an uptick in fires originating in homeless encampments. Smoking in bed, faulty wiring, children playing with matches, and appliance malfunctions are often causes of structural fires. Additionally, cinders from wood-burning fireplaces that remain alive and travel considerable distances have also been blamed for starting fires near residential locations. Therefore, urban fires can generally be mitigated through implementing and enforcing proper building code requirements, reducing the prevalence of gas lines

<sup>13</sup> CAL FIRE, 2022. Tree Mortality. Available online at <https://frap.fire.ca.gov/frap-projects/tree-mortality/>. Accessed January 10, 2022.

and appliances, adherence to fire flow requirement minimums, and instituting zoning or subdivision ordinance requirements as described in the Institutional and Regulatory Framework section.

**SOCIAL VULNERABILITY**

Global climate change has contributed to greater frequency and severity of extreme climate and weather, with increased chance of compound extreme events such as concurrent heat waves and droughts as well as fire weather.<sup>14</sup> While Oakland enjoys a relatively temperate climate due to its bayfront location, changes in climate conditions are already affecting the city, and felt most acutely by frontline communities.

Based on the location of the WUI area and vulnerable communities, higher-income and white residents who make up the majority of the population in the Oakland Hills are more likely to be at significant risk to wildfires. Uncontrolled wildland fires do have the risk of spreading beyond the very high and high vulnerability areas into urban areas, which could impact socially-vulnerable populations. Additionally, the entire city will be impacted by wildfires occurring throughout the metropolitan region via impacts on air/wildfire smoke, water, and soil quality; damage to energy infrastructure and roads; and strain on local firefighting resources as the fire department is called to respond to fires across the region and state. Unhoused populations, outdoor workers, residents who live in poorly insulated or ventilated homes, and people who are already burdened by elevated local (indoor/outdoor) pollution are increasingly at risk due to the consequences of climate change that have exacerbated the now-annual “smoke season.” Goals and policies developed by the City will work to mitigate fire hazards while prioritizing adaptation for socially vulnerable groups through compliance with state laws, fire safe development regulations, and local policies and programs.

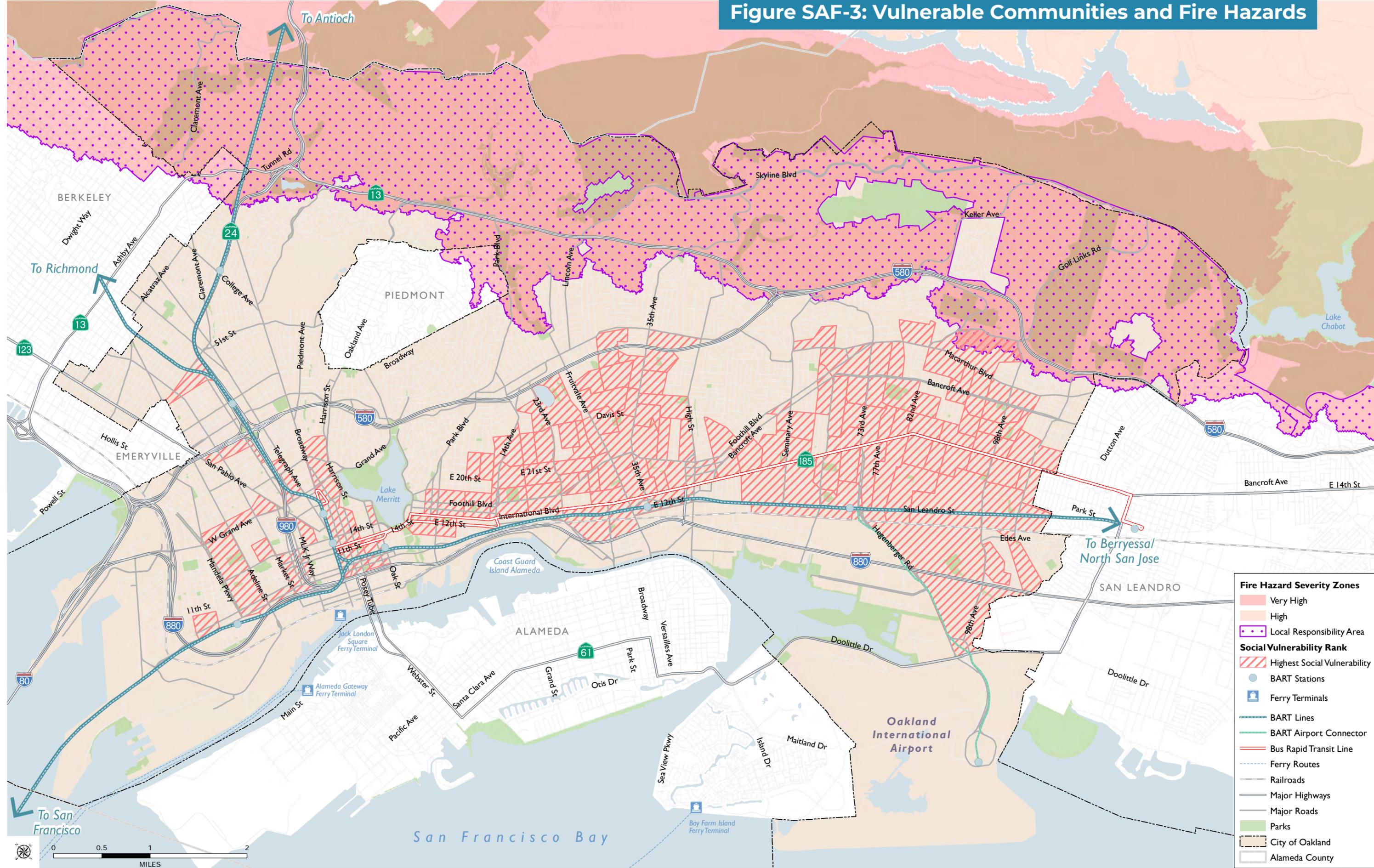
<sup>14</sup> Intergovernmental Panel on Climate Change (IPCC). Climate Change 2021: The Physical Science Basis (Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change). Cambridge University Press, 2021.

**VHFHSZ and Housing Development**

As described previously, the Oakland Hills are largely within a very high fire hazard severity zone/wildland urban interface. Much of the land in the hills is currently zoned for either open space (OS), or Hillside Residential (RH), which is intended to maintain, and enhance residential areas that are primarily characterized by detached, single unit structures on hillside lots. One of the purposes of zoning is to protect public health; for example, preventing a large amount of development in the fire-prone hills is one way to avoid strain on evacuation routes. However, as described in the EJ and Safety Elements, single-family zoning has also explicitly been used as a tool to racially segregate neighborhoods. While civil rights legislation outlawed overt housing discrimination in the 20th century, exclusionary zoning policies that restrict higher density-housing continue to have the effect of limiting racial and economic diversity in these areas.

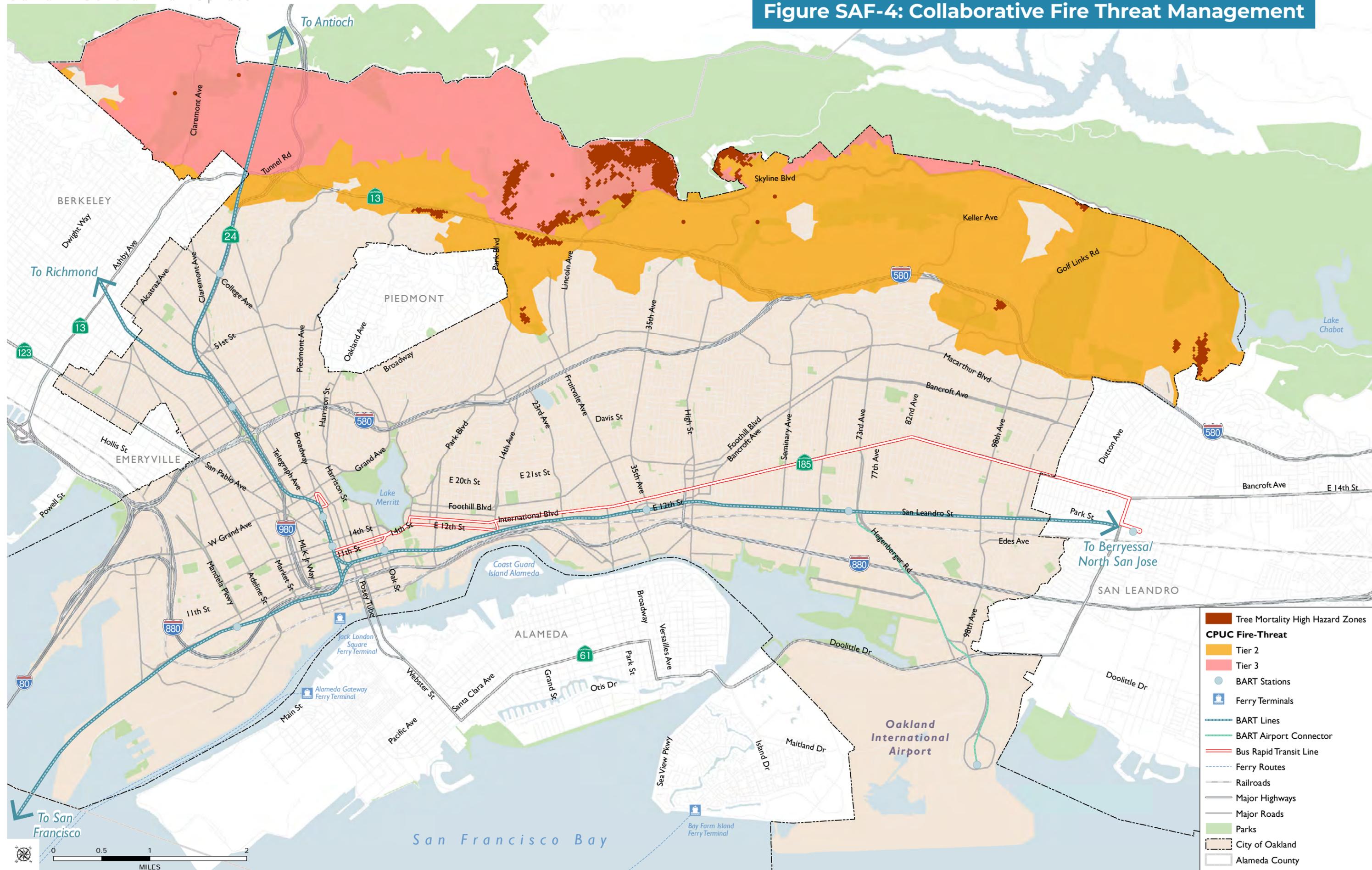
As part of efforts to advance racial equity, policies in the General Plan attempt to balance fire safety considerations with actions that further opportunity in exclusionary single-family areas. For example, the City is proposing an Affordable Housing Overlay, which allows 100 percent affordable developments by-right in select areas located in the VHFHSZ that have adequate emergency access and evaluated for congestion issues in emergency wildfire scenarios (see “Emergency Evacuation” in Chapter 4). Coupled with any zoning changes, the City will continue to require that new development prepare a Fire Protection Plan (Policy SAF-2.3) and will implement specific policies to aid evacuation in these constrained areas.

Figure SAF-3: Vulnerable Communities and Fire Hazards



SOURCE: ESA, 2022; BCDC, 2020; City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2021

Figure SAF-4: Collaborative Fire Threat Management



SOURCE: ESA, 2022; City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2022

## INSTITUTIONAL AND REGULATORY FRAMEWORK

### Fire Safe Development Codes

The California Fire Code (Title 24, Part 9 of the California Code) establishes regulations to protect life and property from the hazards of fires in new and existing buildings and structures. The provisions of the Fire Code apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of buildings or structures throughout California. Public Resources Code 4291 includes regulations and defensible space requirements for areas located in SRAs. The City adopted and amended the 2019 California Fire Code and regulates fire safety in Chapter 15 of the Oakland Municipal Code (OMC). Additionally, the OMC includes a vegetation management inspection program to inspect properties in VHFHSZs for proper vegetation management and includes a chapter of special construction requirements in fire hazard areas in the areas damaged by the 1991 Tunnel Fire.

### Peakload Water Supply Requirement

The Fire Code stipulates fire-flow requirements for buildings.<sup>15</sup> Fire-flow is the rate of a water supply, measured at 20 pounds per square inch (psi) (138 kPa) residual pressure, that is available for firefighting. Fire-flow minimums vary depending on building use, building size, and if a sprinkler system is provided. Water mains serving one- and two-family dwellings, townhouses, and group homes must provide a fire-flow of 1,000 gallons per minute (gpm) for buildings without an automatic sprinkler system, or 500 gpm for buildings with fire protection devices such as automatic sprinkler systems. The required fire-flow standard for commercial, industrial, manufacturing, and large apartment buildings varies from 1,500 to 8,000 gpm based on the type of construction, type of use, and any built-in fire protection devices. School buildings are within Appendix BB of the Fire Code and range between 1,500 to 8,000 gpm depending on type and square footage.

<sup>15</sup> California Fire Code 2019, Appendix B Fire-Flow Requirements for Buildings. Table B105.1(1) and Table B105.1(2).

According to the East Bay Municipal Utility District's (EBMUD) Water Shortage Contingency Plan, Oakland obtains most of its water supply from the Mokelumne River, EBMUD's primary water source. Water flows into Oakland primarily through the Claremont tunnel from the Orinda water treatment plant, then through several aqueducts and large transmission mains into smaller distribution mains supplying the entire city; at the same time, water is stored at various reservoirs located throughout the city. EBMUD is actively planning and implementing additional sources of water supplies from multiple sources, including development of the Bayside Groundwater Project to bank excess water in wet years and withdraw water in drought years, increasing the production and delivery of recycled water in its service area, use of the Freeport Regional Water Facility Long Term Renewal Contract with the U.S. Bureau of Reclamation, and developing water transfers and contracts with other water agencies. The Oakland Fire Department participates in annual meetings with EBMUD and other local jurisdictions to plan for adequate water capacity.

### Minimum Road Widths and Clearances Around Structures

Clear emergency vehicle access to buildings is very important in the event of a fire or seismic event. Such access is regulated by the adopted and amended Fire Code. Under the current Fire Code, all portions of a building shall be within 150 feet of a serviceable fire access road. Fire apparatus access roads shall be all weather roads with a minimum width of 20 feet. However, many streets in the Oakland Hills do not meet current Municipal Code Standards for minimum width and are in steep areas without off-street parking; therefore, residents park on the narrow streets making the streets even narrower and less accessible for emergency responders.<sup>16</sup> Additionally, city infrastructure surveys have shown that the VHFHSZ has many narrow streets with dead ends. Considering these factors, conditions related to emergency response are currently not adequate to serve the population living in the VHFHSZ.

Prompted by community members' concerns and the leadership

<sup>16</sup> City of Oakland Planning Commission, 2021. Case File Number ZA21006 Staff Report. June 2, 2021. Available online: [https://oaklandside.org/wp-content/uploads/2021/06/02-Staff-Report-020621\\_CPC\\_Staff\\_ReportUpdated-signed.pdf](https://oaklandside.org/wp-content/uploads/2021/06/02-Staff-Report-020621_CPC_Staff_ReportUpdated-signed.pdf)

of City councilmembers in Council Districts 1 and 4, the City of Oakland continues to develop solutions to address a serious public safety issue regarding emergency vehicle access through narrow streets. This is especially an issue in Oakland's hills where residents have reported delays in emergency response due to parked cars blocking the roadway, leaving too narrow a space for typically-larger emergency vehicles to safely pass. New signs and enforcement efforts were launched in 2017, with input from the Oakland Fire Department, Oakland Public Works, the Oakland Department of Transportation and the City Administrator's Office. The Fire Department has also explored legislation that would formally prohibit all street parking in the hills on Red Flag Days which are issued by the National Weather Service for weather events which may result in extreme fire behavior that will occur within 24 hours.

Creating defensible space, or the clearance around structures, is another mechanism for improving a building's chance of surviving a wildfire by limiting combustible materials and vegetation up to a 100 feet radius around the structure. The Fire Code requires buildings and structures within areas designated as a VHFHSZ to maintain defensible space. In the adopted and amended Fire Code, the City of Oakland is required to maintain an effective 30-foot defensible space by removing and clearing away flammable vegetation and combustible growth from structures. The OMC and vegetation inspection program requires that owners of both vacant and developed lots in the area comply with fire-hazard-abatement requirements, which include removal of overgrown grass, brush and weeds; the removal of low-hanging tree branches, street-address numbers visible from the road;



and maintenance of firebreaks, which are natural or constructed barriers used to stop or check fires that may occur or to provide a control line from which to work. To align with the City's objective of preserving and enhancing green infrastructure networks, it is important that the provision of defensible space does not result in the expansion of impervious surface area. Property owners should integrate defensible space strategies with green infrastructure as much as possible.

In 2021, planning efforts were initiated to develop a Vegetation Management Plan, which includes various activities, such as goat grazing, vegetation clearing and monitoring, and brush clearance for more than 1,400 acres of City property plus 300 acres of roadside treatment areas within the designated VHFHSZ in the Oakland Hills. Policies and actions in the General Plan support development and implementation of the Vegetation Management Plan and consideration of other methods to provide ongoing revenue for additional efforts for vegetation management. The Vegetation Management Plan is expected to be adopted in winter 2023/2024.

### **Responsible Agencies**

There are several agencies responsible for fire prevention and emergency response in the Bay Area. This Element emphasizes interagency coordination and planning efforts between the City of Oakland and the following agencies to best mitigate and adapt to urban fire and wildfire. In addition, the City aims to closely consult and coordinate with community-based organizations in order to best engage residents about fire hazards. Such community groups may include the Greenlining Institute, Oakland Climate Action Coalition, and Communities for a Better Environment.

**The California Department of Forestry and Fire Protection (CAL FIRE)** manages fire prevention and response for the State of California. CAL FIRE oversees enforcement of California's forest protection regulations, implements fuel management projects, participates in forest conservation and management, and provides training and educational programs. CAL FIRE also engages in general emergency response activities.

## **Fuel Reduction and Management**

In December 2021, the City was awarded over \$820,000 in new grant funding from CAL FIRE to selectively remove approximately 250 dead, dying, or otherwise hazardous trees, and selectively prune hazardous branches on trees lining or overhanging the Skyline Boulevard Evacuation Corridor, beginning at Shepherd Canyon Road and ending at Keller Avenue, and plant 150 Oak trees to serve as shaded fuel breaks. Starting in 2022, tree crews have been working closely with the Oakland Fire Department (OFD) and the Public Works Department to advance the project. These funds come from CAL FIRE's budget available for distribution for fire fuels reduction projects.

**The Oakland Fire Department** is the primary emergency response service provider for the City of Oakland, and provides comprehensive strategies and training in fire prevention, fire suppression, emergency medical services, all risk mitigation, emergency preparedness, 911 services and community-based fire services.

**The Vegetation Management Unit (VMU)** serves to inspect properties in the Oakland Hills, much of which is designated as a VHFHSZ. The VMU works under the Oakland Fire Department's Fire Prevention Bureau. The VMU is responsible for the inspections of over 20,000 homes and vacant parcels in the VHFHSZ. The purpose of these inspections is to identify and mitigate hazards that could contribute to the spread, growth, and intensity of wildfire. The VMU conducts inspections annually, and property owners are required to actively maintain their parcels in a fire-safe condition year-round.

**The Emergency Management Services Division (EMSD)** exists within the Oakland Fire Department and is the primary agency responsible for responding to, recovering from, and mitigating against any hazard that affects the City of Oakland.



## GOALS AND POLICIES

### GOAL SAF-2: PROACTIVELY PREVENT URBAN FIRES AND EXPOSURE TO WILDFIRE AND PROTECT COMMUNITY MEMBERS AND PROPERTY FROM FIRE DANGER.

**SAF-2.1 Structural Fires.** Continue, enhance, or implement programs that seek to reduce the risk of structural fires. Prioritize programs in areas with greatest risk and greatest social vulnerability.

**SAF-2.2 Vegetation and Urban Forest Management.** Manage vegetation and the urban forest to reduce combustible load, erosion, and other risks exacerbated by climate change.

- Adopt and fully implement a Vegetation Management Plan for high-fire risk areas. Continue to update and enforce the Oakland Fire Code to require building owners in high-risk areas to maintain defensible space and implement fire prevention measures. As part of the Vegetation Management Plan, build partnerships with and consult indigenous groups on sacred burning and other traditional fire suppression techniques.
- Implement the Urban Forest Master Plan, a comprehensive, area-wide urban canopy and vegetation plan that identifies locations where trees can be added and maintained, such as parks, streets, and rights-of-way. As a follow-up action, proactively address soil sequestration of carbon and water in frontline communities most affected by wildfire and other climate risks. See *Environmental Justice Element policy EJ-6.16 for other urban forest objectives.*

**SAF-2.3 Development in the Very High Fire Hazard Severity Zone (VHFHSZ).** Prioritize development in areas with existing adequate road networks, evacuation routes, and water infrastructure. Require any new development in the Very High Fire Hazard Severity Zone to prepare a Fire Protection Plan that minimizes risks by:

- Assessing site-specific characteristics such as topography, slope, vegetation type, wind patterns etc.
- Siting and designing development to avoid hazardous locations (e.g. through fire breaks) to the extent feasible.
- Incorporating fuel modification and brush clearance techniques in accordance with applicable fire safety requirements and carried out in a manner which reduces impacts to environmentally sensitive habitat to the maximum feasible extent.
- Using fire-resistant building materials and design features, such as visible signage, consistent with the adopted Oakland Municipal Code and Fire and Building Code standards.
- Using fire-retardant, native plant species in landscaping.
- Complying with established standards and specifications for fuel modification, defensible space, access, and water facilities.
- Banning fuel storage (e.g., fuel storage for power generators) in VHFHSZ.
- Requiring street improvements to comply with minimum fire road access standards.
- Disallowing new subdivisions in areas with less than two evacuation routes (as shown in [Figure SAF-11d](#)), unless a development were to be able to provide additional connections to ameliorate this condition.

**SAF-2.4 Slope-Density Regulations.** Reduce permitted development densities and intensities by slope tiers—such as between 15 and 30 percent slope, and greater than 30 percent slope—in hills/hillside areas. *This consideration would be considered and reflected as part of the LUTE update.*

**SAF-2.5 Financial Assistance.** Identify or develop programs to provide financial incentives or assistance to low-income households for defensible space maintenance, home hardening, and other measures to reduce risk.

**SAF-2.6 Agency Coordination.** Continue to participate not only in general mutual-aid agreements but also in agreements with adjoining jurisdictions and other public agencies for cooperative response to fires, including multi-jurisdictional programs and task forces.

**SAF-2.7 Protect Against Smoke and Wildfire.** Improve access to better indoor air quality to protect against smoke and wildfire through methods such as requiring installation of MERV filters in new developments and identifying additional clean air centers and resilience spaces within residential areas.

**SAF-2.8 Water Infrastructure.** In partnership with EBMUD, plan for the ongoing maintenance and long-term integrity of planned and existing water supply infrastructure, including peak load water supply.

## 2.3 CLIMATE CHANGE

The consequences of climate change are intensifying worldwide, underscoring the urgent need for action. California is one of the most “climate-challenged” regions of North America; its historical climate is highly variable, and climate change is making extreme conditions more frequent and severe.<sup>17</sup> Given the complexity of the global climate system and the significant uncertainty regarding long-term greenhouse gas emissions, the results of different climate change projections can look quite different. See the City of Oakland’s Climate Change Vulnerability Assessment for more information regarding climate projections that inform this Safety Element. Because climate change is cross-cutting, goals, actions, and policies related to climate change are incorporated into each associated hazard, as well as in the Environmental Justice Element.

In the San Francisco Bay Area, annual maximum temperatures have already increased by 1.7°F from 1950-2005, sea levels have risen over eight inches in the last 100 years, and several studies suggest that the coastal fog critical to the Bay Area climate is less frequent than before. Such changes will also affect the natural ecosystems that characterize the Bay Area, such as becoming less suitable for the iconic redwood forests that once dominated the region.<sup>18</sup> Despite global efforts to reduce greenhouse gas emissions, changes in temperature, precipitation, and sea level rise are projected to increase significantly in the coming decades and will produce substantial impacts on Bay Area social systems and the built environment as well as natural and managed resource systems. Oakland is among a growing number of Bay Area local governments, agencies, nonprofits, and private sector stakeholders that are taking actions that advance climate adaptation and resilience, including through its 2030 ECAP.

<sup>17</sup> Louise Bedsworth, et. al., “California’s Fourth Climate Change Assessment Statewide Summary Report,” California Governor’s Office of Planning and Research, Scripps Institution of Oceanography, California Energy Commission, California Public Utilities Commission, 2018, [https://www.energy.ca.gov/sites/default/files/2019-11/Statewide\\_Reports-SUM-CCCA4-2018-013\\_Statewide\\_Summary\\_Report\\_ADA.pdf](https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf). Accessed February 10, 2022.

<sup>18</sup> David Ackerly, et. al., “California’s Fourth Climate Change Assessment San Francisco Bay Area Summary Report,” University of California, Berkeley, 2018, [https://www.energy.ca.gov/sites/default/files/2019-11/Reg\\_Report-SUMCCCA4-2018-005\\_SanFranciscoBayArea\\_ADA.pdf](https://www.energy.ca.gov/sites/default/files/2019-11/Reg_Report-SUMCCCA4-2018-005_SanFranciscoBayArea_ADA.pdf). Accessed February 10, 2022.

The continual emission of greenhouse gases (GHGs) and resulting effects on the climate crisis are an issue of equity. Frontline communities, those who have been and will continue to be hit first and worst by the impacts of environmental injustice and the climate crisis, are often the least able to adapt, resist, or recover from climate impacts.<sup>19</sup> For example, increasingly extreme climate conditions will have cost implications, such as energy costs needed to heat or cool a home. These additional costs will be felt more acutely by populations that are already impacted by severe housing, transportation, and/or healthcare cost burdens. Furthermore, neighborhood characteristics affected by historical disinvestment and other racial disparities create even more of a burden. For example, neighborhoods with fewer trees and green spaces or inadequate funding to maintain these resources would lack the benefits experienced by a neighborhood with ample shade and cooling from a healthy urban forest (discussed in the ‘Urban heat and drought’ section). Additionally, people who do not own a car and rely on public transportation may be exposed to extreme climate conditions, especially where public transportation infrastructure is not designed for these conditions.

Alameda County faces climate change exposures that pose considerable health risks to the population, especially to frontline communities. For further information on impacts to vulnerable groups, see the City of Oakland’s Climate Change Vulnerability Assessment and the 2030 ECAP (see callout box on p. 4-3). Climate change will result in increased impacts on natural hazards, including wildfire, flooding, sea level rise, drought, and urban heat. Thus, the Safety Element incorporates a range of topics as well as climate change adaptation and resiliency strategies into its goals and policies.

<sup>19</sup> City of Oakland, Oakland 2030 Equitable Climate Action Plan, 2020.



### INCREASED IMPACTS ON WILDFIRE, PRECIPITATION CHANGES, SEA LEVEL RISE

As global climate change intensifies the frequency and severity of extreme climate and weather, it has led to an increased likelihood in compound extreme events, such as concurrent heat waves, droughts, and fire weather.<sup>20</sup> Historically, wildfire has exhibited a cyclical pattern within California—some years may see intense wildfire while others may not. As wildfire emerges from a variety of climate conditions including type of vegetative cover, precipitation, and temperature, wildfire severity will continue to fluctuate over time. However, climate change will favor many of the climatic conditions that make wildfire more likely, meaning that average wildfire intensity will gradually increase. Wildfire is associated with a host of secondary impacts such as smoke production and air quality issues, reductions in soil and water quality, landslides, erosion, and impacts to health, energy, and transit systems.

Climate change models predict changes in the seasonal distribution of precipitation, with rainfall becoming more concentrated in the winter months and falling in fewer, higher-intensity events. These changes may result in a number of secondary impacts, such as flooding, reduction in winter snowpack, drought, groundwater depletion, increased wildfire risk, changes in streamflow, and strain to health, energy, and infrastructure systems. Flooding effects will be felt most strongly in coastal and low-lying areas, and areas with inadequate stormwater infrastructure.

Projections for global sea level rise vary between one foot in the next few decades up to seven feet anticipated by 2100. According to sea level rise scenarios outlined in the City of Oakland 2021 – 2026 LHMP, the San Francisco Bay is projected to experience a 48-inch rise in sea level by 2050, and a 108 inch rise in sea level by 2100.<sup>21</sup> Potential for new or prolonged flooding as the sea level rises will increasingly reach beyond the city’s shoreline; areas once considered to be outside of the floodplain will begin to experience periodic coastal and/

<sup>20</sup> Intergovernmental Panel on Climate Change (IPCC), Climate Change 2021: The Physical Science Basis (Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, 2021,

<sup>21</sup> California Ocean Protection Council, Sea-Level Rise Guidance, 2018.

or urban flooding, especially places like the Port of Oakland and the Oakland International Airport, which are chronically subsiding (i.e., sinking because they are built on bay fill) and are at higher risk of liquefaction during seismic events.<sup>22</sup> Neighborhoods/tracts that will be most affected by sea level rise are shown in **Table SAF-1**.

### URBAN HEAT AND DROUGHT

Alongside the rise in global temperatures, precipitation patterns in California are also changing. Less precipitation is falling as snow, and more is falling as rain. Reduced winter snowpack will negatively impact local water availability, particularly during drought periods. Drought frequency may also increase as rainstorms become less likely during the summer months.

As of 2022, the entire state of California remains in extreme drought conditions due to a lack of rainfall and higher average temperatures as a result of climate change. Effects from drought may be felt most acutely in winter months, with drought periods also becoming more likely in the future. The driest winter months in 100 years mark the third year of drought for the state. January, February, and March of 2022 had the least rain and snow on record for any of these months in California. This is the state's second extreme drought in 10 years, indicating the impacts of a changing climate<sup>23</sup>.

Climate change also affects public health: global temperature increases and exacerbated climate severity can lead to respiratory issues from wildfire smoke, an extended allergy season, and heat-related illness. Drought also has public health implications for food systems. As the ECAP notes, worsening climate change impacts, including prolonged drought, unpredictable weather patterns, fires, and flooding, are already straining and disrupting agricultural resources and food supply chains, which also exacerbate local food insecurity. Policies related to food security and accessibility are found in the Environmental Justice Element.

<sup>22</sup> City of Oakland, 2021-2026 Hazard Mitigation Plan, July 2021, [https://cao-94612.s3.amazonaws.com/documents/2021-07-01\\_OaklandHMP\\_AdoptedFinal-1.pdf](https://cao-94612.s3.amazonaws.com/documents/2021-07-01_OaklandHMP_AdoptedFinal-1.pdf).

<sup>23</sup> California, State of. "Current Drought Conditions." California Drought Action, [drought.ca.gov/current-drought-conditions/](https://drought.ca.gov/current-drought-conditions/).

**Table SAF-1: Top 10th Percentile Tracts by Indicator — Climate Change Topic**

HEAT HEALTH EVENTS MAX TEMP		ENERGY COST BURDEN		SEA LEVEL RISE	
Tract Name <sup>1</sup>	Score	Tract Name	Score	Tract Name	Score
Panoramic Hill	1.00	<b>Lockwood/Coliseum/Rudsdale</b>	1.00	Port Lower*	1.00
		<b>Lower San Antonio East</b>	0.99	<b>Port Upper</b>	0.99
		<b>Fitchburg</b>	0.98	Acorn Industrial*	0.98
		<b>Castlemont</b>	0.97	<b>Brookfield Village/Hegenberger</b>	0.97
		<b>New Highland</b>	0.96	<b>Lockwood/Coliseum/Rudsdale</b>	0.96
		<b>Brookfield Village</b>	0.96	<b>Prescott/Mandela Peralta</b>	0.96
		<b>Bancroft/Havenscourt East</b>	0.95	<b>Chinatown/Laney</b>	0.95
		<b>Seminary</b>	0.94	<b>Jack London Square</b>	0.94
		<b>Stonehurst</b>	0.93	<b>McClymonds</b>	0.93
		<b>Webster</b>	0.92	<b>Melrose</b>	0.92
		<b>Arroyo Viejo</b>	0.91	Eastlake	0.91
		<b>Sobrante Park</b>	0.90	<b>Oakland Estuary</b>	0.90

*Note: Bolded and green census tracts are EJ Communities.*  
<sup>1</sup> Only includes one tract in top decile due to ties. Next highest score is 0.89.  
 \*Indicates census tract with low population.

While the combined effects of regional topography, oceanic currents, fog exposure, and onshore winds function like a natural air conditioner for the Bay Area, studies suggest that summertime fog off California has declined substantially, making warming near the coast as much of a concern as in inland areas. Increases in urban temperature may be felt most acutely by those living in urban heat islands – pockets of the urban environment where temperatures can dramatically exceed those in neighboring non-urban areas. The proliferation of paved surfaces in built environments can lead to these urban heat islands, especially in places where urban forestry and water bodies are not commonly found. This can further increase summertime cooling costs. For Oakland residents, this means that both the city's hills and flatlands will feel the heat, and the built environment will be a key driver for maintaining the comfort and health of Oaklanders.

Local hotspots in the city that will have increased heat exposure—including parts of Fruitvale/South Kennedy, the Coliseum Industrial Complex, Frick/Bancroft Business area, Castlemont, Oak Knolls-Golf Links/Chabot Park, Webster, and the Oakland International Airport area—are hotter than their surroundings. Urban heat island effects can be moderated by the cooling effects of trees and irrigation in urban landscapes, which have been estimated to reduce daytime summer temperatures across urbanized portions of the Bay Area by an average of 1.8°F. See the Environmental Justice Element for more information on efforts to increase tree canopy in underserved areas. Areas of greatest urban heat exposure, greatest energy cost burden, and greatest risk for sea level rise as identified as part of the EJ Communities screening analysis are shown in **Table SAF-1**.

## 2.4 HYDROLOGY AND FLOODING

### HYDROLOGY

Flooding is the inundation of normally dry land as a result of a rise in the level of surface waters or the rapid accumulation of storm-water runoff. It becomes a hazard when the flow of water has the potential to damage property and threaten human life or health. Oakland is subject to riverine flooding, flash flooding, and stormwater flooding. Riverine flooding occurs when streams and rivers exceed the capacity of their channels to accommodate water flow and water overflows the banks, spilling out into adjacent land. The National Weather Service defines a flash flood as a “rapid and extreme flow of high water into a normally dry area, or a rapid rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event.” Stormwater flooding occurs from a precipitation event that can overwhelm a stormwater management system, causing water to inundate roads and property.

The City of Oakland’s watershed consists of 15 main creeks, over 30 tributaries, Lake Merritt, Lake Temescal, and the Oakland Estuary. According to FEMA’s December 21, 2018, Flood Insurance Study (FIS), the City of Oakland drainage systems are adequate to carry low frequency storm runoff. However, larger storms can cause stormwater flooding.



### FLOODING

#### Storm-Induced Flooding and Flood Hazard Zones

Flood hazards are mapped by the Federal Emergency Management Agency (FEMA) as part of the National Flood Insurance Program. The 100-year Flood Zone, which has a 1 percent annual chance flood risk, and 500-year Flood Zone, which has a 0.2 percent annual chance flood risk, are depicted in **Figure SAF-5**. Flood hazards are dynamic and can change frequently due to a variety of factors, including weather patterns, erosion, and new development. FEMA, through the Risk MAP program, works with communities to collect new or updated flood hazard data and periodically updates flood maps to reflect these changes. The primary areas of flooding in Oakland are along the shoreline of the San Francisco Bay, Oakland Estuary, and San Leandro Bay. Flooding is also associated with Lake Merritt and Glen Echo Creek, as well as Arroyo Viejo, Lion, Sausal, and Peralta creeks, and the areas near these bodies of water are at the most risk of being impacted during flood events. Most of the City’s developed shoreline is not within the current 100-year Flood Zone, except the north part of the Oakland International Airport.<sup>24</sup> The LHMP estimates that there are approximately 14,600 structures in the 100-year Flood Zone, and major new development is also occurring in several areas along the shoreline, including the Brooklyn Basin area. While recent projects take sea level rise projections into account, areas that pre-date updated flood maps and the latest best available sea level rise science may be at risk of flooding in the future.

Historically, flooding has been the most frequent natural hazard occurring in Oakland, with most hazard associated with excess stormwater runoff from heavy rain. Since 1950, the National Climatic Data Center (NCDC) reported flood events, 26 of which were flash floods, within Alameda County, amounting to a total of \$18,349,000 in lost property damages. As described in the City of Oakland 2021 – 2026 LHMP, Alameda County and the communities within it have experienced 12 flooding events since 1969 for which federal disaster declarations were issued. Many flood events do not trigger federal disaster declaration protocol but

<sup>24</sup> The portion of the airport designated by FEMA as Zone X indicates an area that is determined to be outside the 500-year flood and is protected by levee from 100-year flood.

have significant impacts on their communities. Large floods can result in multiple severe and widespread impacts including damage to electric and transportation infrastructure, destruction of homes and businesses, increased rates of flood-borne disease, and loss of life.

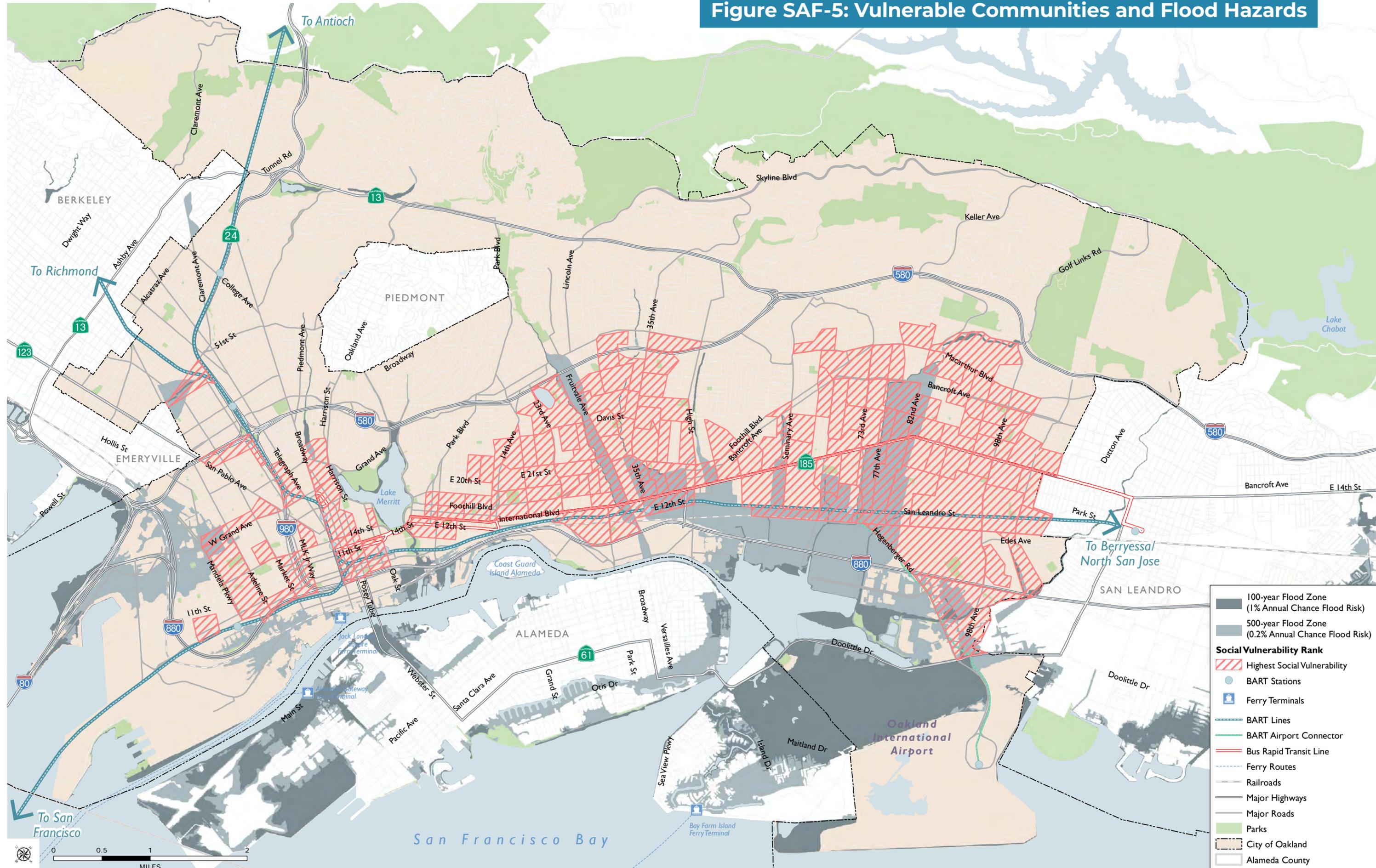
Severe flooding in the region is often the result of a combination of topographic features; severe weather or excessive rainfall; and infrastructure characteristics such as inadequate stormwater drainage and elevated levels of impervious surface. Stormwater flooding is most likely to occur in areas with elevated levels of impervious surface and in places where stormwater infrastructure is impaired or inadequate.<sup>25</sup>

To help address storm-induced flooding in areas with inadequate stormwater drainage, the City of Oakland is developing a new Storm Drainage Master Plan that will include a detailed and comprehensive examination of, including condition and sizing, its storm drainage system, and will model flooding conditions and create a list of high priority capital projects for future work. This project is also identifying and developing conceptual plans for large green stormwater infrastructure (GSI) projects designed to capture stormwater from a large watershed area (from 1 to over 100 acres). If feasible to build, the large GSI projects would help alleviate flooding in specific areas with inadequate storm drainage. The project is also evaluating opportunities to daylight creeks where multiple benefits could be achieved such as urban greening, flood protection, and habitat enhancement. The Storm Drainage Master Plan will be completed in 2024.

In 2019, the City of Oakland developed a Green Stormwater Infrastructure Plan to comply with the California Regional Water Quality Control Board’s Municipal Regional Stormwater Permit (MRP), work within the Alameda Countywide Clean Water Program, and to protect and restore watersheds within the City. “Green Stormwater Infrastructure” refers to a variety of practices and engineered facilities designed to detain and clean, capture and reuse, or infiltrate stormwater runoff to reduce the volume of runoff and improve water quality. In accordance with the City’s Resilient Oakland Playbook, Oakland will use green stormwater

<sup>25</sup> 2021 Local Hazard Mitigation Plan [LHMP].” City of Oakland, <https://www.oaklandca.gov/topics/2021-local-hazard-mitigation-plan>. Accessed 9 Sept. 2022.

**Figure SAF-5: Vulnerable Communities and Flood Hazards**



SOURCE: ESA, 2022; BCDC, 2020; City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2022

infrastructure to manage stormwater and help reduce the risk of nuisance flooding, where feasible, from smaller storms.

See the Environmental Justice Element for more information on how the City plans to use green stormwater infrastructure and urban greening to address water quality issues and inequities in environmental justice communities.

**Tsunami and Seiche**

A tsunami is a series of high-energy waves that radiate outward like pond ripples from an area where a generating event occurs, arriving at shorelines over an extended period. Tsunamis can be induced by earthquakes, landslides, and submarine volcanic explosions. According to the 2016 Alameda County Local Hazard Mitigation Plan, tsunamis have not been a major problem in Alameda County or most of the Bay Area and have resulted in insignificant damage. Further, the hazard in the bay is much smaller than along the Pacific Coast, as the bay is an enclosed body of water. From 1812 to 2000, NOAA recorded 22 tsunamis in the Bay Area.

Flooding from tsunamis would affect low-lying areas along San Francisco Bay and the Oakland Estuary, especially filled areas that are only a few feet above sea level. Areas that could be flooded with several feet of water include the Bay Bridge landing, the outer and middle harbor of the Port of Oakland’s seaport, the San Leandro Bay shoreline (including Martin Luther King, Jr. Regional Shoreline) and the Oakland International Airport’s shoreline. Areas along the inner harbor, Brooklyn Basin and the tidal channel would be sheltered by the island of Alameda. The likelihood of large-scale devastation in Oakland resulting from tsunamis appears to be small, especially as there would usually be several hours to evacuate residents and undertake other emergency preparations for most tsunamis approaching the coast.<sup>26</sup>

A seiche is a resonant, side-to-side movement of water in a closed or mostly closed body of water such as the San Francisco Bay. The USGS defines a seiche as the sloshing of a closed body of water which can be caused from earthquake shaking. Unlike

<sup>26</sup> City of Oakland, 2004. City of Oakland General Plan, Safety Element. Available online: <https://www.oaklandca.gov/resources/safety-element>

tsunamis, which are created by the sudden uplift of the sea floor, seismic seiches are standing waves that occur when an earthquake passes through the area. In Oakland, the only threat of large-scale damage from seiches appears to come from downstream flooding that would be caused by large volumes of water overtopping a dam or reservoir. Thus, the likelihood of large-scale devastation in Oakland resulting from seiches is minimal.<sup>27</sup>

**Dam Failure and Inundation**

The California Department of Water Resources’ Division of Safety of Dams reviews and approves inundation maps for extremely high, high, and significant hazard dams. There are four dams in Oakland that are considered extremely high hazard dams: Lake Temescal, Central, Dunsmuir Reservoir, and Chabot. Piedmont and Seneca dams are also in the vicinity, but they are considered

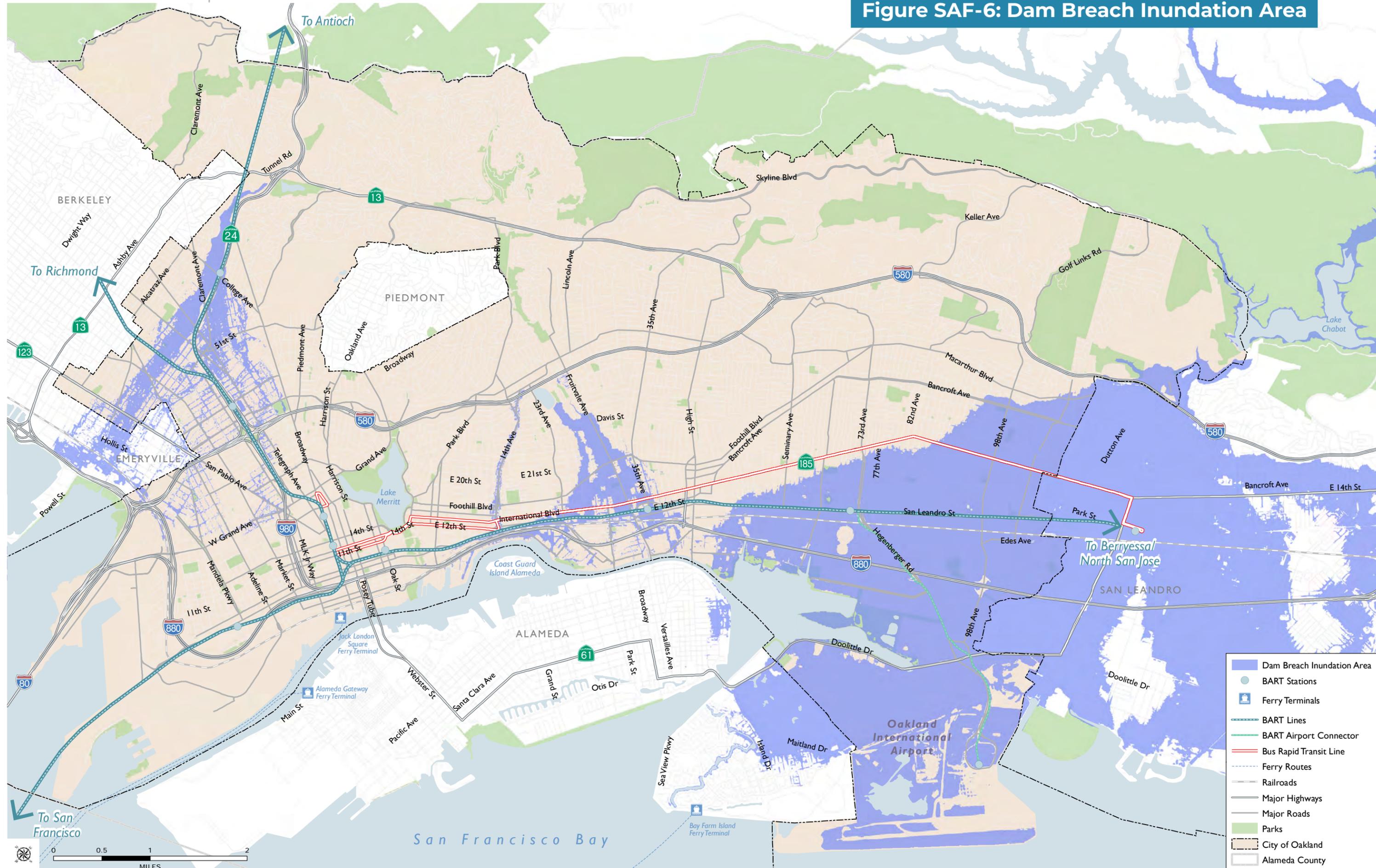
<sup>27</sup> City of Oakland, 2004. City of Oakland General Plan, Safety Element. Available online: <https://www.oaklandca.gov/resources/safety-element>

a low hazard and do not have associated inundation maps. **Figure SAF-6** depicts the inundation areas for Lake Temescal, Central, Dunsmuir Reservoir, and Chabot dams.

According to the 2021 – 2026 LHMP, many dam failures in the United States have been secondary results of other disasters. The most common causes are earthquakes, landslides, extreme storms, equipment malfunction, structural damage, foundation failures, and sabotage. Poor construction, lack of maintenance and repair, and deficient operational procedures are preventable or correctable by a program of regular inspections. Terrorism and vandalism are serious concerns that all operators of public facilities must plan for; these threats are under continuous review by public safety agencies. Flooding from dam failure, while unlikely, could have catastrophic impacts on portions of North and East Oakland. However, the risk posed by dam failures is mitigated by the regulatory safeguards in place.



Figure SAF-6: Dam Breach Inundation Area



SOURCE: ESA, 2022; City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2022

**SEA LEVEL RISE**

Oakland is bordered to the west by more than 20 miles of San Francisco Bay coastline. While the bay is an important biological, cultural, recreational, and economic resource, it also poses an environmental risk to residents and properties located near the waterfront. Sea level rise, the rise in global sea level accompanying other effects of global climate change, has already increased San Francisco Bay water levels by nearly eight inches in the last century.<sup>28</sup> As sea level rise increases further, it will increase the flooding hazard from the bay, especially during storm events.

Additionally, relatively new research by the SF Estuary Institute, (SFEI) UC Berkeley, and Pathways Climate Institute discussed in the Climate Vulnerability Assessment suggests that rising water tables caused by sea-level rise could result in previously unexamined hazards for residents and infrastructure in those areas. According to a report prepared by the Pathways Climate Institute and SFEI, “low-lying inland areas could flood from below by emergent groundwater long before coastal floodwaters overtop the shoreline.”<sup>29</sup> Compounding the hazards associated with sea level rise related flooding alone, emergent groundwater can cause legacy soil contamination to migrate to the surface, mobilizing toxic liquids and waste from contaminated pits or piles. As discussed in the Environmental Justice Element, groundwater contamination hazards are more likely to affect low-lying census tracts closer to the waterfront than census tracts located in the Oakland Hills.

Following from the sea-level rise (SLR) projections used in the City’s 2021-2026 LHMP, the 100-year coastal flood with 0.5 foot of SLR and 5.5 feet of SLR, respectively, provide a near-term and long-term indication of future flood hazards. For 0.5 foot of SLR (Figure SAF-7), the City’s exposure to 100-year coastal flooding remains similar to present day, with Oakland International Airport

28 National Oceanic and Atmospheric Administration (NOAA), 2018. Center for Operational Oceanographic Products and Services (CO-OPS), NOAA Sea-Level Trends 1987-2018, 2018. [tidesandcurrents.noaa.gov/sltrends/sltrends\\_station.shtml?stnid=9414290](https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=9414290).

29 May, C. L.; Mohan, A.; Plane, E.; Ramirez-Lopez, D.; Mak, M.; Luchinsky, L.; Hale, T.; Hill, K. 2022. Shallow Groundwater Response to Sea-Level Rise: Alameda, Marin, San Francisco, and San Mateo Counties. Pathways Climate Institute and San Francisco Estuary Institute.

being most at risk. A few other small sections of the City shoreline are also exposed to 100-year flood hazards. Potential for new or prolonged flooding as the sea level rises will increasingly reach beyond the city’s shoreline; areas once considered to be outside of the floodplain will begin to experience periodic coastal and/or urban flooding, especially places like the Port of Oakland and the Oakland International Airport, which are chronically subsiding (i.e., sinking because they are built on bay fill) and are at higher risk of liquefaction during seismic events.<sup>30</sup>

**SOCIAL VULNERABILITY**

Lower-income areas and communities of color, particularly in Oakland’s flatlands, are most affected by sea level rise hazards. Neighborhoods at risk of flood hazards primarily include Central/East Oakland, Coliseum/Airport, and census tracts in Eastlake/Fruitvale, and West Oakland. The dam breach inundation area affects the majority of Central/East Oakland as well as parts of Eastlake/Fruitvale and North Oakland. Sea level rise and tsunamis will primarily impact populations located along the coastline in West Oakland and Central/East Oakland, as well as the Port of Oakland and the Oakland International Airport.

Unhoused individuals are especially vulnerable to climate change impacts. Unhoused individuals experience elevated levels of exposure to environmental stressors such as high heat, poor air quality, and flooding. In the event of a climate emergency, unhoused populations may lack a secure place to shelter and they are often more difficult to reach via emergency alert systems.<sup>31</sup> Additionally, unhoused individuals may be overlooked during disaster planning initiatives, and often lack legal standing that may be required to access support services and resources during and after climate disasters. Vulnerable populations such as individuals with disabilities, children, and elderly populations also face unique challenges related to the impacts of climate change. For an in depth discussion of the relationship between

30 City of Oakland, 2021-2026 Hazard Mitigation Plan, July 2021, [https://cao-94612.s3.amazonaws.com/documents/2021-07-01\\_OaklandHMP\\_AdoptedFinal-1.pdf](https://cao-94612.s3.amazonaws.com/documents/2021-07-01_OaklandHMP_AdoptedFinal-1.pdf).

31 Thomas, K., Hardy RD., Lazrus H., Mendez M., Orlove B., Rivera-Collazo, I., Roberts JT., Rockman M., Warner BP., Winthrop R., Explaining differential vulnerability to climate change: A social science review (December 2018). Oct 29 2019: <https://onlinelibrary.wiley.com/doi/full/10.1002/wcc.565>.

social vulnerability and climate change in Oakland, please refer to the Climate Hazards and Vulnerability Assessment.

Goals and policies developed by the City will work to mitigate these flood and sea level rise hazards while prioritizing adaptation for socially vulnerable groups through the development of local policies and resilience programs in association with state guidance. Such policies will foster community and regional engagement for sea level rise planning. Coupled with policies on future sea level rise monitoring, findings from these engagement efforts will help the City establish planning thresholds for new development, sea level rise adaptation strategies, and other shoreline protection measures. Climate adaptation strategies called out in the 2030 ECAP include the development of at least three Resilience Hubs by 2030, two of which (those serving West Oakland and East Oakland) will be located in areas at risk of flood hazards.





## INSTITUTIONAL AND REGULATORY FRAMEWORK

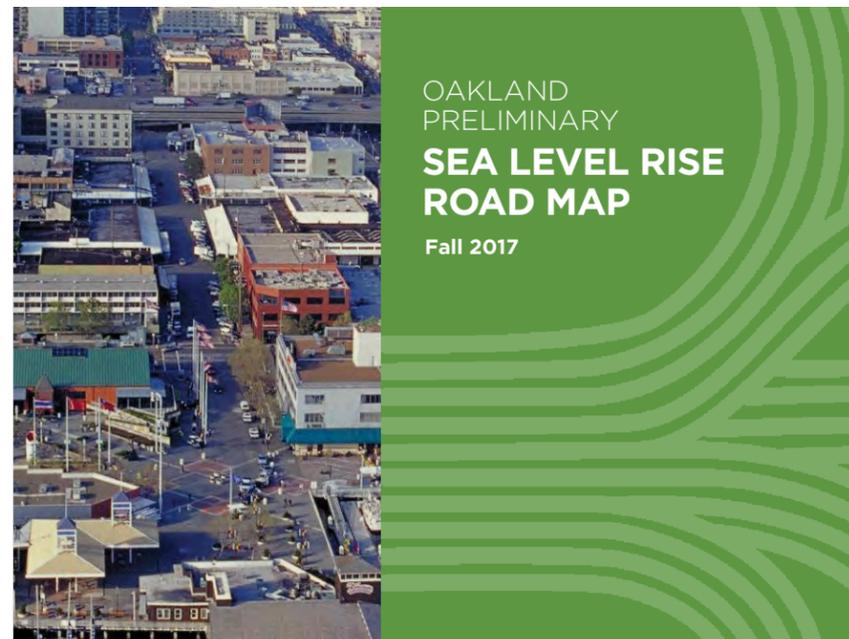
FEMA is responsible for managing the 100-year floodplain, areas with a 1 percent or greater chance of flooding in any given year. A Flood Insurance Rate Map, an official FEMA-prepared map, is used to delineate both the Special Flood Hazard Areas (the 100-year floodplain) and the flood-risk premium zones in a community (as shown in [Figure SAF-5](#)). Under Executive Order 11988, FEMA requires local governments that are covered by the National Flood Insurance Program to pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year floodplain. FEMA administers the National Flood Insurance Program, which includes floodplain management and flood hazard mapping and provides subsidized flood insurance to communities that comply with FEMA regulations to limit development in floodplains.

Current state guidance calls for preparing for at least 3.5 feet of sea-level rise by 2050.<sup>32</sup> These adaptation strategies will be incorporated into the goals and policies of the Safety Element. Should in the long-term future a regional sea level rise adaptation solution, such as water lock near the Golden Gate Bridge, be pursued, this would affect Oakland as well.

The City's ongoing efforts have begun to address how shorelines could be protected from sea level rise in the future. The 2017 Preliminary Sea Level Rise Road Map was developed as part of Resilient Oakland, a coordinated effort to align resources, plans, and actions in support of a thriving and resilient community. Oakland was competitively selected in December 2013 to join 100 Resilient Cities, an initiative pioneered by the Rockefeller Foundation that aims to help cities around the world build resilience to the social, economic, and physical challenges of the 21st century. Several groundbreaking sea level rise studies have already been conducted for parts of the Oakland shoreline. Based on these studies, critical assets such as highways, transit stations, schools, wastewater infrastructure, and landfills are anticipated to be impacted by sea level rise. The Road Map builds on the findings from those studies, as well as other work carried out by the City

and community organizations, to document existing conditions, set forth potential actions to address these conditions, and continue focus on this critical area of the City's resilience. To address changes since the 2017 Sea Level Rise Road Map and incorporate the most recent climate data, the City Administrator's Office plans to update the Sea Level Rise Road Map in 2023.

Priority actions for the City of Oakland identified by the Sea Level Rise Road Map include identifying and pursuing engagement and collaboration opportunities, participating in regional coordination, better understanding neighborhood vulnerabilities, enabling climate-smart development, and identifying funding to develop a citywide comprehensive adaptation strategy. The Safety Element incorporates these priority actions in its goals and policies to ensure implementation is occurring in an efficient and appropriate manner. The Vulnerability Assessment also provides a starting place for community engagement around potential climate change impacts and resilience strategies. Under uncertain future climate change scenarios, protecting shorelines and adapting to sea level rise will need to continue to be an iterative process that requires community coordination and guidance. See the previous Climate Change section in this Element for more information regarding future climate change projections.



## Responsible Agencies

There are several agencies responsible for flood management and emergency response in the Bay Area. This Element emphasizes interagency coordination and planning efforts between the City of Oakland and the following agencies to best mitigate and adapt to flooding and sea level rise. In addition, the City aims to closely consult and coordinate with community-based organizations in order to best engage residents about flooding hazards and sea level rise. Such community groups may include Save The Bay, SF Estuary Institute, and the East Oakland Collective.

**The California Department of Water Resources** engages in flood management and flood emergency response programs. It developed the Flood Emergency Response Information Exchange to improve flood emergency preparedness, response, and recovery. The Department also implements the Sustainable Groundwater Management Act and administers the California Statewide Groundwater Elevation Monitoring Program.

**San Francisco Bay Regional Water Quality Control Board** enforces waterway protection and pollution control regulations in Oakland. In 2009 it adopted the NPDES Municipal Regional Stormwater Permit (MRP), which requires the City to use GSI (aka Low Impact Development) to treat and control stormwater on-site for development projects that add/replace impervious surfaces. The permit also requires the City to retrofit five additional acres of existing impervious surface so that it is treated and managed by GSI between 2022 and 6/30/2027).

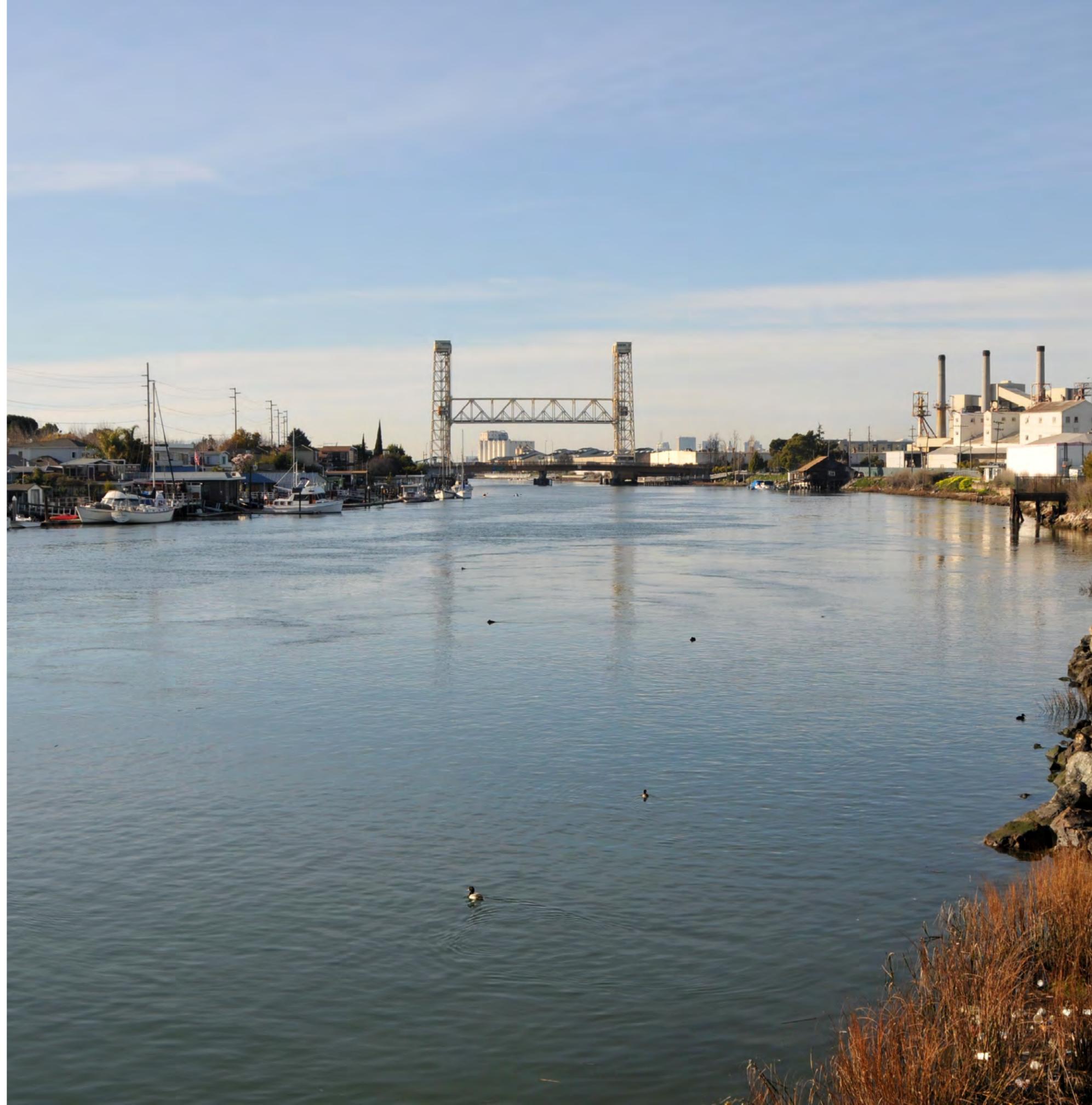
**Bay Conservation and Development Commission (BCDC)** has regulatory jurisdiction over existing and proposed land use changes and structures within 100 feet (inland) from the Bayshore's mean high water elevation. Sea Level Rise vulnerability and risk assessments are required when planning shoreline areas or designing larger shoreline projects in BCDC's jurisdiction. Risk assessments must be based on the best available estimates of future SLR. New projects on Bay fill, likely to be affected by future SLR and storm surge activity during the life of the project, must meet additional requirements, and when feasible, integrate hard shoreline protection structures with natural features that enhance the Bay ecosystem (e.g., including marsh and/or upland vegetation).

<sup>32</sup> California Ocean Protection Council, 2020. Strategic Plan to Protect California's Coast and Ocean 2020-2025

**Alameda County Flood Control & Water Conservation District** plans, constructs, and maintains Western Alameda County's flood control systems such as creeks, channels, levees pump stations, reservoirs, and dams. It also performs hydrologic, geotechnical, and environmental studies, and enforces waterway pollution control regulations in waterways under Alameda County jurisdiction.

**The Port of Oakland**, under the direction of the Port Commission, has broad regulatory authority over trust lands granted pursuant to the Burton Act. The Port has its own land use and development code, and oversees the permitting of new construction and rehabilitation projects in its jurisdiction, though the Port must obtain building permits through the City's Planning and Building Department. Jurisdictional authority of the Port includes 20 miles of waterfront, and includes ground, commercial, retail, office, industrial, and maritime industrial leases, and landmarks such as Jack London Square.

**The Emergency Management Services Division (EMSD)** exists within the Oakland Fire Department and is the primary agency responsible for responding to, recovering from, and mitigating against any hazard that affects the City of Oakland.



**GOALS AND POLICIES**

**GOAL SAF-3: PROTECT PEOPLE AND PROPERTY FROM FLOODING.**

- SAF-3.1 Minimize Storm Induced Flooding.** Continue or strengthen city programs that seek to minimize the storm-induced flooding hazard.
- SAF-3.2 Storm-Induced Flooding Structural Risk.** Enforce and update local ordinances, and comply with regional orders, that would reduce the risk of storm-induced flooding.
- SAF-3.3 Reestablish Full Compliance and Good Standing Under the National Flood Insurance Program (NFIP).** The City will coordinate with FEMA Region IX and DWR to address all identified issues from the open September 2017 Community Assistance Visit (CAV) to reestablish the City’s full compliance and good standing under the NFIP.
- SAF-3.4 Flood Control Coordination.** Continue to coordinate with FEMA, the Alameda County Flood Control and Water Conservation District (ACFCWCD), and the State Division of Safety of Dams on flood-control-related projects.
- SAF-3.5 Green Stormwater Infrastructure.** Fund and implement a green infrastructure program for the installation and maintenance of projects and existing civic resources such as the parks system and public spaces, to improve stormwater management, support biodiversity, reduce air pollution exposure, improve water quality, and increase access to natural spaces, including trees. Prioritize green stormwater infrastructure investment in frontline communities, particularly in residential neighborhoods dominated by concrete and asphalt with limited green space and elevated air pollution; in Priority Conservation Areas; and in areas where

green infrastructure, including trees and other types of vegetated buffers, can effectively address stormwater management issues and reduce air pollution exposure among sensitive populations. *This policy is cross-listed as Action EJ-A.13 in the Environmental Justice Element.*

**GOAL SAF-4: PROACTIVELY PLAN FOR IMPACTS OF SEA LEVEL RISE ON PEOPLE, PROPERTY, AND ESSENTIAL INFRASTRUCTURE.**

- SAF-4.1 Sea Level Rise and Community Engagement.** As recommended in the Sea Level Rise Roadmap and ECAP, develop a plan for continuing collaboration with community groups and local organizations working to address sea level rise adaptation and building resilience of vulnerable communities. Work with communities to use community-generated data critical to future SLR mapping efforts.
- SAF-4.2 Current Development and Sea Level Rise.** Use in planning and development reviews, as applicable, the best available science about projected sea level rise and other climate change-related environmental changes when addressing flooding, potential for groundwater contamination, and other hazards associated with sea level rise.
- SAF-4.3 New Development and Sea Level Rise.** Develop sea-level rise standards/horizon that will guide adaption and resiliency planning as part of the updated Sea Level Rise Roadmap, including recommendations and regulations for a suite of shoreline protection measures (including ecologically-friendly adaptation options), protective setbacks, and other adaptation strategies, to be incorporated into future development projects.

**SAF-4.4 Sea Level Rise Vulnerability Assessment.** Require applicants proposing to develop in a future inundation area (as depicted in a SLR scenario to be determined in subsequent administrative regulations or documents) to conduct a Sea Level Rise vulnerability assessment for the project, prepare a Sea Level Rise Adaptation Plan for implementation as part of the project designs, and submit the assessment, adaptation plan, and conceptual design to the City for review and approval.

**SAF-4.5 Evaluating Bay/Watershed Flooding Potential.** In partnership with other agencies, including the Port of Oakland, the Bay Area Bay Conservation and Development Commission, and the ACFCWCD, re-evaluate both Bay flooding and watershed flooding potential at key milestones in the Safety Element’s implementation horizon, to manage for changing sea level rise projections.

**SAF-4.6 Sea Level Rise Regional Strategy.** As part of the Sea Level Rise Roadmap update, continue to work with regional entities to address rising water levels in the San Francisco Bay and coordinate with the City’s other climate adaptation efforts.

This page intentionally left blank.



## 3. Human-Made Hazards

As an urban city, the day-to-day operations of industry and human activity often also mean use, handling, or production of hazardous materials or environments. Human-made hazards discussed in this section include sites affected by hazardous materials and cleanup sites, issues related to climate change, airport hazards, and public safety. Air quality and pollution, including toxic air contaminants, are discussed in the Environmental Justice Element, as the geographic distribution of polluting facilities and inequitable impacts to communities of color and lower-income communities is a distinct environmental justice issue. This section concludes with a discussion of goals and policies intended to equitably address human-made hazards and minimize risks to human health and environmental quality.

### 3.1 HAZARDOUS MATERIALS

#### HAZARDOUS SITES/CLEANUP SITES

Exposure to hazardous materials can result in lung damage, cancer, cardiovascular disease, low birth weight infants, and other negative health outcomes that reduce life expectancy. Hazardous sites and materials threaten environmental quality and can result in soil and groundwater contamination. This is especially true of sites that used hazardous materials before adoption of current environmental regulations. Exposure to hazardous materials can also result in lung damage, cancer, cardiovascular disease, low birth weight infants, and other negative health outcomes that reduce life expectancy.<sup>1</sup> A review of the online regulatory databases (EnviroStor and GeoTracker) reveals that there

<sup>1</sup> 2045 general Plan Update: Oakland Map Atlas, 2022 [https://cao-94612.s3.amazonaws.com/documents/Map-Atlas\\_Revised.pdf](https://cao-94612.s3.amazonaws.com/documents/Map-Atlas_Revised.pdf)

are approximately 1,700 documented hazardous materials sites currently identified within the city.<sup>2,3</sup> As shown in **Figure SAF-8** a vast majority of these sites are concentrated in areas with industrial land uses in East and West Oakland. About 57 percent of sites have been “closed” to indicate that they have completed remediation and/or have demonstrated that existing site uses do not present a significant risk to human health or the environment. Almost a quarter of all sites are actively being remediated and five percent of these sites are operational facilities that are currently certified to handle hazardous materials.<sup>4</sup>

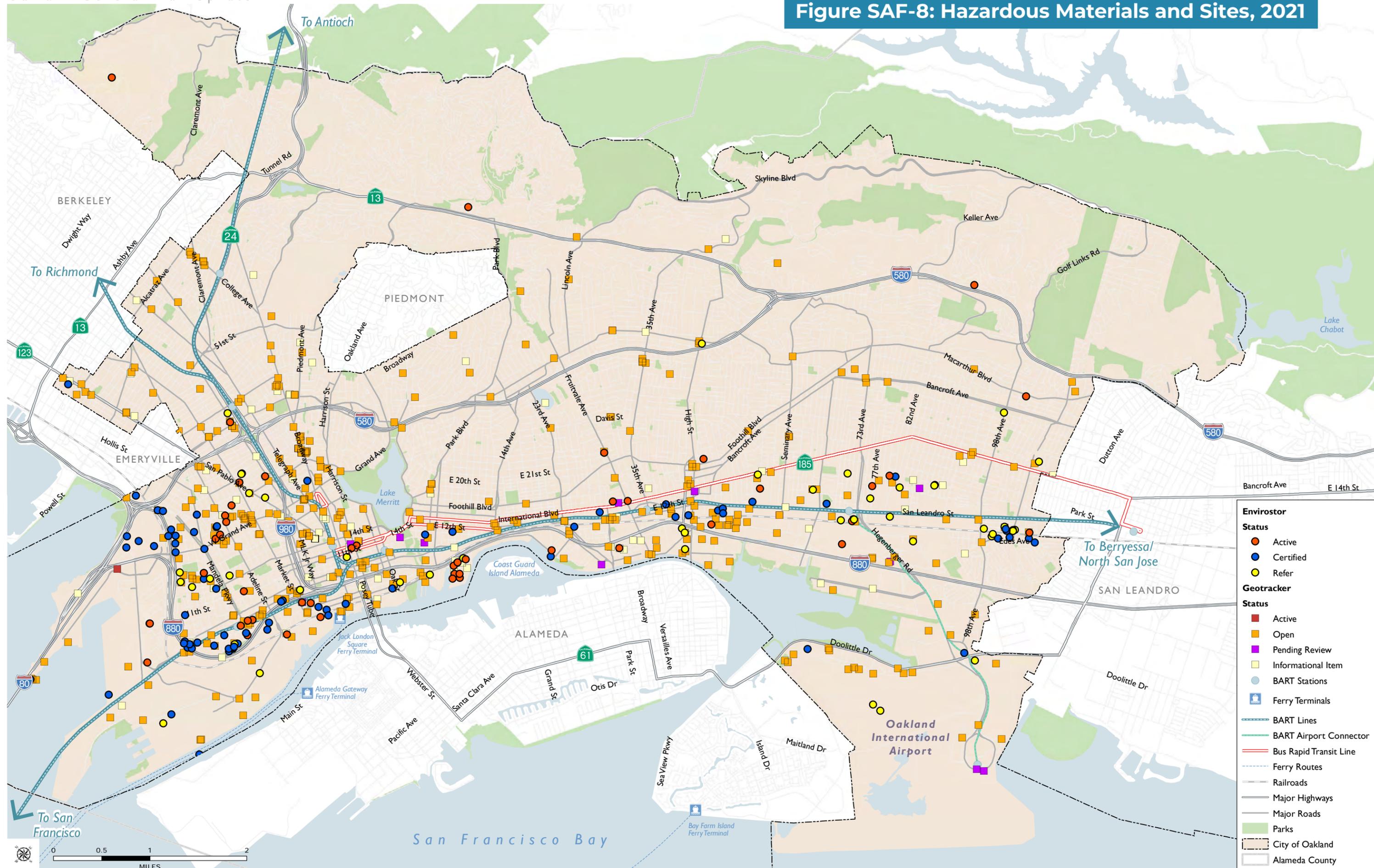
Risks associated with hazardous sites, closed or not, may be worsened by seismic activity, flooding, groundwater intrusion, or new development. Excavation and grading work that occur during construction have the possibility to expose the public to

<sup>2</sup> More information about CalEnvirostor and hazardous site determinations in Oakland is available in the Oakland Map Atlas.

<sup>3</sup> 2045 general Plan Update: Oakland Map Atlas, 2022 [https://cao-94612.s3.amazonaws.com/documents/Map-Atlas\\_Revised.pdf](https://cao-94612.s3.amazonaws.com/documents/Map-Atlas_Revised.pdf)

<sup>4</sup> Environmental Justice and Racial Equity Baseline. City of Oakland, CA, Mar. 2022, [https://cao-94612.s3.amazonaws.com/documents/Equity-Baseline\\_revised4.15.22.pdf](https://cao-94612.s3.amazonaws.com/documents/Equity-Baseline_revised4.15.22.pdf).

Figure SAF-8: Hazardous Materials and Sites, 2021



Envirostor	
<b>Status</b>	
<span style="color: orange;">●</span>	Active
<span style="color: blue;">●</span>	Certified
<span style="color: yellow;">●</span>	Refer
<b>Geotracker</b>	
<b>Status</b>	
<span style="color: red;">■</span>	Active
<span style="color: orange;">■</span>	Open
<span style="color: purple;">■</span>	Pending Review
<span style="color: yellow;">■</span>	Informational Item
<span style="color: lightblue;">●</span>	BART Stations
<span style="color: blue;">■</span>	Ferry Terminals
<span style="color: blue;">—</span>	BART Lines
<span style="color: green;">—</span>	BART Airport Connector
<span style="color: red;">—</span>	Bus Rapid Transit Line
<span style="color: lightblue;">—</span>	Ferry Routes
<span style="color: grey;">—</span>	Railroads
<span style="color: grey;">—</span>	Major Highways
<span style="color: grey;">—</span>	Major Roads
<span style="color: green;">■</span>	Parks
<span style="border: 1px dashed black;"> </span>	City of Oakland
<span style="border: 1px solid black;"> </span>	Alameda County

contaminated materials either through physical contact or hazardous vapors. Mismanagement or mishandling of contaminated groundwater and soil may spread contamination through surface water runoff or airborne dust, increasing the public’s exposure to these hazards.

**Cortese List – DTSC Hazardous Waste and Substance Sites**

The California Environmental Protection Agency (CalEPA) is required by State law to maintain an annually updated list of Hazardous Waste and Substances Sites, known as the Cortese List. The Cortese List provides information on the location of hazardous materials release sites, including hazardous waste and substance sites identified by the California Department of Toxic Substances Control (DTSC) Envirostor Database, Leaking Underground Storage Tank Sites (LUSTs) from the California Water Resource Control Board (WRCB), and the list of solid waste disposal sites identified by the WRCB. Within the city, hazardous waste and substances from the DTSC EnviroStor Database are listed in **Table SAF-2**.

**Figure SAF-10** shows CalEnviroScreen data for DTSC Cleanup Sites within the city. The data depicted in **Figure SAF-10** represents DTSC EnviroStor records of active hazardous materials sites (represented on the figure as yellow points). Each census tract is assigned a “Cleanup Site Percentile” (a score) based on the amount and types of Cleanup Sites present; each score fits into a range of percentiles. Each range of percentiles is assigned a corresponding color (shade of red), the darkest red representing the highest score (and highest hazard). A high score indicates that a census tract is more vulnerable than one with a lower score. In the case of Cleanup Sites, a high score indicates a census tract is more vulnerable to exposure to hazardous materials that can affect human health and the environment. Areas that are most affected by hazardous sites are shown in **Table SAF-3**. More information on Hazardous materials can also be found in the Environmental Justice Element.

**Cortese List - Underground Storage Tanks and Leaking Underground Storage Tanks**

Underground storage tanks (USTs) and leaking underground storage tanks (LUSTs) are an additional component of the CalEPA

**Table SAF-2: Hazardous Waste and Substances Cortese List Sites**

FACILITY NAME	PROGRAM TYPE	STATUS	ADDRESS
Hard Chrome Engineering	State Response	Active	750 107th Avenue
E-D Coat Inc	State Response	Active	715 4th Street
Port Of Oakland, Berth 25 And 26	State Response	Certified / Operation & Maintenance - Land Use Restrictions	2500 7th Street
Dutch Boy #3	State Response	Certified / Operation & Maintenance - Land Use Restrictions	4825 San Leandro Street
Harris Dry Cleaners	State Response	Active	2801 Martin Luther King Jr. Way
Southern Pacific -West Oakland Rail Yard	State Response	Certified / Operation & Maintenance - Land Use Restrictions	Cypress Corridor
General Electric - Oakland	State Response	Active - Land Use Restrictions	5441 International Boulevard
Amco Chemical	Federal Superfund - Listed	Active	1414 Third Street
Port Of Oakland - Embarcadero Cove	State Response	Certified / Operation & Maintenance - Land Use Restrictions	Dennison And Embarcadero Streets
Howard Marine Terminal Site	State Response	Active - Land Use Restrictions	Embarcadero West and Market Streets
Action Plating (2w)	State Response	Certified / Operation & Maintenance - Land Use Restrictions	10132 Edes Avenue
Cal Tech Metal Finishers	State Response	Active	825, 829, 841 31st Street
Commercial Buildings	State Response	Active	1250-1276, 1284 W. Grand & 2232 Poplar

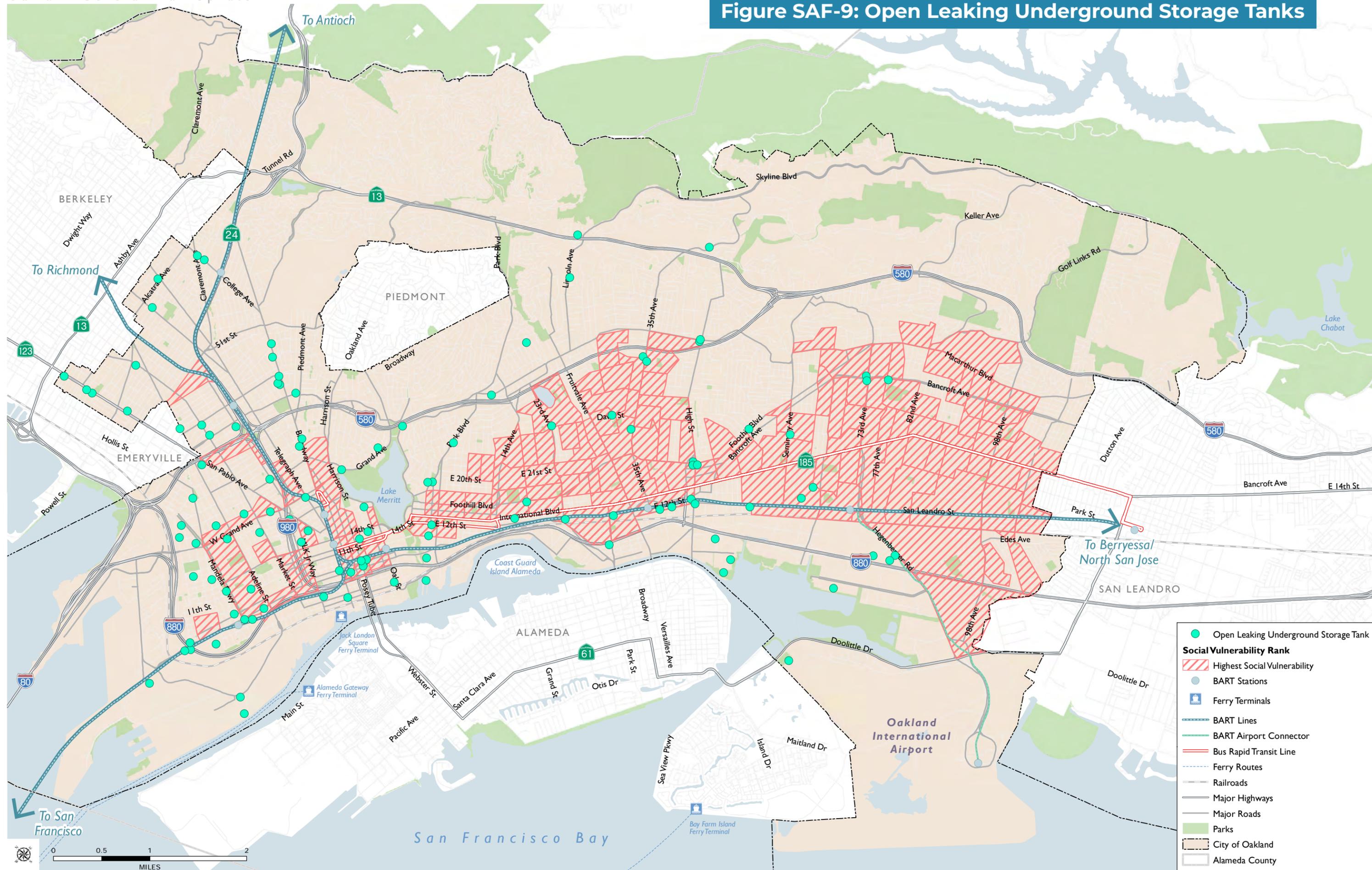
Source: CalEPA Cortese Sites List, Department of Toxic Substances EnviroStor Database

Cortese List. An underground storage tank (UST) is defined by law as “any one or combination of tanks, including pipes connected thereto, that is used for the storage of hazardous substances and that is substantially or totally beneath the surface of the ground.” Leaking underground fuel storage tanks (LUSTs) are a significant source of petroleum impacts to groundwater. USTs may impact health and safety via exposure from impacts to soil and/or groundwater, contaminated drinking water aquifers, contaminated public or private drinking water wells, or vapors

inhalation.<sup>5</sup> The California Water Resources Control Board administratively categorizes LUSTs by their cleanup status; LUST sites are considered “open” if the site is currently in use and no remediation has taken place while “closed” sites are no longer in use and have gone through environmental remediation. Shown in **Figure SAF-9**, there are currently 114 open LUSTs in Oakland. Many of these sites are concentrated in downtown and West Oakland.

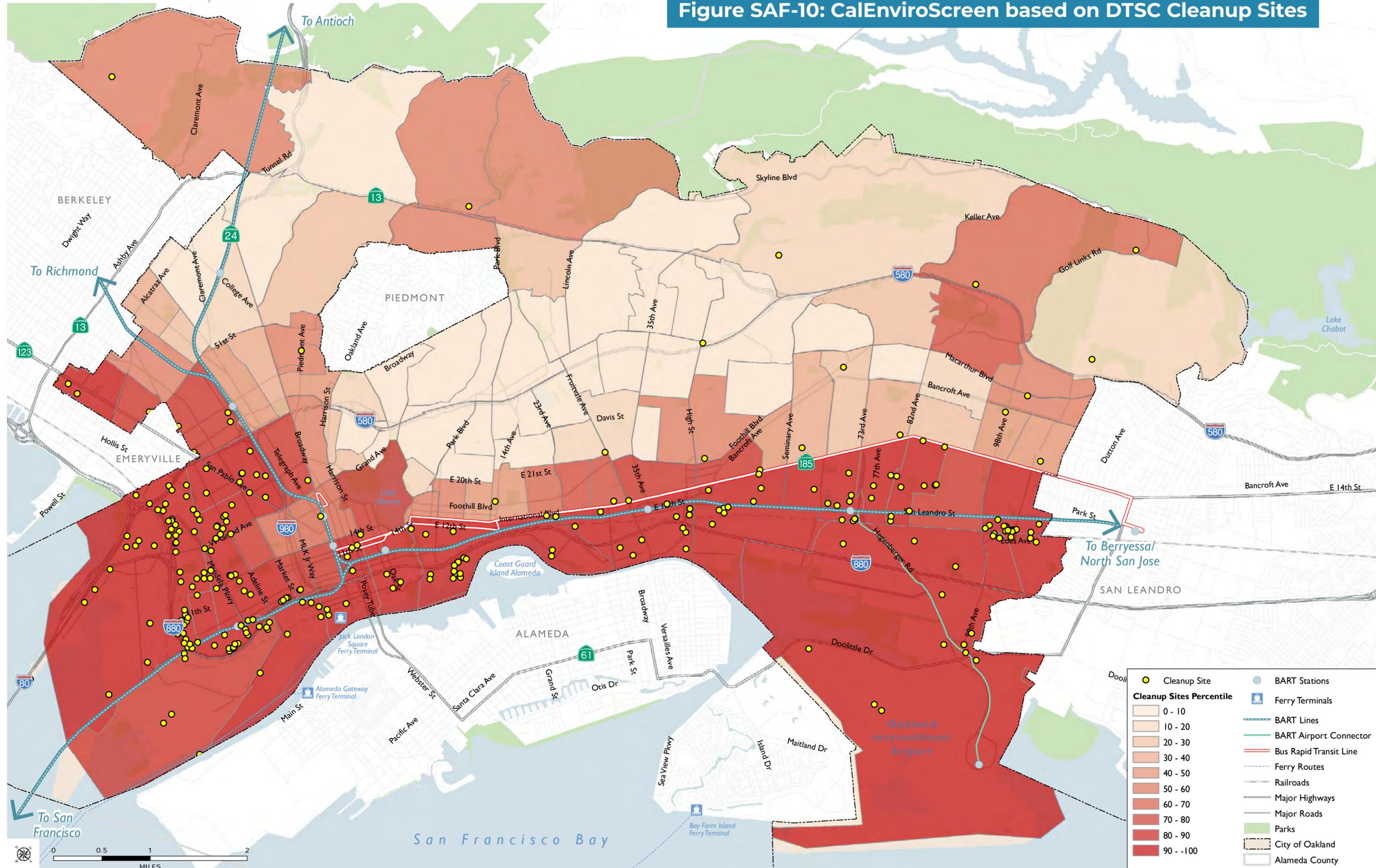
<sup>5</sup> Underground Storage Tank Program - Cleanup | California State Water Resources Control Board. <https://www.waterboards.ca.gov/ust/cleanup/>. Accessed 9 Sept. 2022.

Figure SAF-9: Open Leaking Underground Storage Tanks



- Open Leaking Underground Storage Tank
- Social Vulnerability Rank**
- Highest Social Vulnerability
- BART Stations
- Ferry Terminals
- BART Lines
- BART Airport Connector
- Bus Rapid Transit Line
- Ferry Routes
- Railroads
- Major Highways
- Major Roads
- Parks
- City of Oakland
- Alameda County

Figure SAF-10: CalEnviroScreen based on DTSC Cleanup Sites



SOURCE: ESA, 2022; City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2022

**Table SAF-3 Top 10th Percentile Tracts by Indicator — Hazardous Materials**

CLEANUP SITES		HAZARDOUS WASTE SITES		TOXIC RELEASES		SOLID WASTE SITES <sup>1</sup>		PROXIMITY TO INDUSTRIAL ZONES <sup>2</sup>	
Tract Name	Score	Tract Name	Score	Tract Name	Score	Tract Name	Score	Tract Name	Score
<b>Port Upper</b>	<b>1.00</b>	Acorn Industrial*	<b>1.00</b>	<b>Fitchburg</b>	<b>1.00</b>	<b>Melrose</b>	<b>1.00</b>	<b>Melrose</b>	<b>0.92</b>
<b>Prescott/Mandela Peralta</b>	<b>0.99</b>	<b>Jack London Square</b>	<b>0.99</b>	<b>Lockwood/Coliseum/Rudsdale</b>	<b>0.99</b>	<b>Port Upper</b>	<b>0.99</b>	<b>Port Upper</b>	<b>0.92</b>
<b>Oakland Estuary</b>	<b>0.98</b>	Paradise Park/Golden Gate	0.98	Paradise Park/ Golden Gate	0.98	<b>Lockwood/Coliseum/Rudsdale</b>	<b>0.98</b>	<b>Brookfield Village/Hegenberger</b>	<b>0.92</b>
Acorn Industrial*	0.97	Piedmont Ave South	0.97	Bushrod/North Oakland	0.97	<b>Brookfield Village/Hegenberger</b>	<b>0.97</b>	<b>Fitchburg</b>	<b>0.92</b>
<b>DeFremery/Oak Center</b>	<b>0.96</b>	<b>Brookfield Village/Hegenberger</b>	<b>0.96</b>	Panoramic Hill	0.96	<b>Prescott</b>	<b>0.96</b>	<b>Sobrante Park</b>	<b>0.92</b>
<b>McClymonds</b>	<b>0.96</b>	<b>New Highland</b>	<b>0.96</b>	<b>Brookfield Village/Hegenberger</b>	<b>0.96</b>	Chabot Park	0.95	<b>McClymonds</b>	<b>0.92</b>
<b>Clawson/Dogtown</b>	<b>0.95</b>	<b>Oakland/Harrison West</b>	<b>0.95</b>	Santa Fe/North Oakland	0.95	Sequoyah	0.95	<b>DeFremery/Oak Center</b>	<b>0.92</b>
<b>Prescott</b>	<b>0.94</b>	<b>Acorn</b>	<b>0.94</b>	Upper Telegraph/Fairview Park	0.94	<b>Fitchburg</b>	<b>0.94</b>	<b>Jack London Square</b>	<b>0.92</b>
<b>Melrose</b>	<b>0.93</b>	<b>Port Upper</b>	<b>0.93</b>	<b>New Highland</b>	<b>0.93</b>	<b>Prescott/Mandela Peralta</b>	<b>0.93</b>	Port Lower	0.92
<b>Jingletown/ Kennedy</b>	<b>0.92</b>	<b>Pill Hill</b>	<b>0.92</b>	Bushrod/Children's Hospital	0.92	<b>Jingletown/Kennedy</b>	<b>0.92</b>	Acorn Industrial*	0.92
<b>Hoover/Foster</b>	<b>0.91</b>	<b>Jack London Gateway</b>	<b>0.91</b>	<b>Sobrante Park</b>	<b>0.91</b>	<b>New Highland</b>	<b>0.91</b>	<b>Prescott/Mandela Peralta</b>	<b>0.91</b>
<b>Jack London Square</b>	<b>0.90</b>	Downtown/Old Oakland	0.90	Rockridge	0.90			<b>Jingletown/ Kennedy</b>	<b>0.90</b>

Note: Bolded census tracts in green are EJ Communities. \* Indicates census tract with low population.

1. Only includes 11 tracts in top decile due to ties. Next highest score is 0.88.

2. Maximum score is 0.92 due to ties.

### SOCIAL VULNERABILITY

Many of the most vulnerable census tracts in Oakland are also in areas with the highest density of hazardous materials sites. CalEnviroScreen 4.0 identifies higher concentrations of BIPOC communities in Oakland living in tracts that have higher pollution burden scores, meaning that they are more at risk than white populations. Alameda County of Public Health (ACPHD) data show that average life expectancy can vary by as much as 15 years across one mile, from Oakland's flatlands to Oakland's Hills, depending on race.<sup>6</sup>

<sup>6</sup> Oakland 2030 Equitable Climate Action Plan (ECAP). City of Oakland. (n.d.). <https://www.oaklandca.gov/projects/2030ecap>

The density of chemical and fuel release sites in high-poverty neighborhoods is four times higher than in affluent neighborhoods. Oakland's Department of Race and Equity (DRE) found in 2018 that Black children in Oakland were 10 times more likely than white children to be admitted to the emergency department for asthma-related conditions.<sup>7</sup> Contaminants and corresponding public health hazards are particularly prevalent from West to East Oakland along the I-880 freeway. Environmental Justice Communities are also often found closest to Oakland's shoreline, placing them at increased risk of groundwater intrusion and flooding.<sup>8</sup>

<sup>7</sup> Ibid.

<sup>8</sup> See the Climate Change Vulnerability Assessment for the City of Oakland for further discussion of the cascading impacts of flooding and groundwater intrusion.

It is no accident that Environmental Justice Communities in East and West Oakland are most exposed to hazardous sites and bear the greatest pollution burdens; decades of racialized land-use decisions systematically concentrated industrial uses and pollution hazards in BIPOC communities. Because of these discriminatory practices, Oaklanders with the least ability to pay for and recover from environmental health threats are also the most impacted.

Goals and policies developed by the City will work to mitigate the effects of pollution and hazardous materials while prioritizing adaptation for socially vulnerable groups through compliance with state laws, pollution regulations, and local policies and programs.

## INSTITUTIONAL AND REGULATORY FRAMEWORK

Interagency coordination and collaboration will be essential to address the complex and frequently cascading challenges presented by human-made hazards. Though state and federal agencies are often responsible for establishing pollution standards, regional and local agencies may implement more context-specific regulations that reflect the needs and priorities of local communities. This Element emphasizes interagency coordination and planning efforts between the City of Oakland and the following agencies to best minimize risk from human-made hazards.

### Responsible Agencies

The following is a review of relevant agencies with the capacity to address human-made hazards presented in this section. It lists federal, state, regional and local agencies and also describes programs, plans, and tools provided at the state and federal level that the City can leverage to address human-made hazards. In addition, the City aims to closely consult and coordinate with community-based organizations in order to best engage residents about hazardous materials and other environmental justice issues. Such community groups may include the West Oakland Environmental Indicators Project, Communities for a Better Environment, Trees for Oakland, and the East Oakland Collective.

**The United States Environmental Protection Agency (EPA)** tracks six common air pollutants, called “criteria air pollutants” that are found all over the U.S. and have been shown to harm human and environmental health as well as cause property damage. These include ground-level ozone, particulate matter, carbon monoxide (CO), lead, sulfur dioxide (SO<sub>2</sub>), and nitrogen dioxide (NO<sub>2</sub>). EPA calls these pollutants “criteria” air pollutants because it sets National Ambient Air Quality Standards (NAAQS) for them based on the latest scientific information regarding their effects on human health or welfare.

**California Air Resources Board (CARB)** is a state agency that establishes emission standards for mobile air pollution sources in conjunction with federal agencies such as the EPA. CARB has developed statewide programs to encourage cleaner cars and cleaner fuels such as California’s cleaner-burning gasoline

regulation, which has reduced smog-forming emissions from motor vehicles by 15 percent and cancer risk from exposure to motor vehicle toxics by about 40 percent since the regulation was implemented in 1996.<sup>9</sup>

CARB also maintains California’s air toxics program, which is based on state legislation that requires CARB to identify and control toxic air pollutants. On February 10, 2022, the California Air Resources Board designated East Oakland for the development of an AB 617 Community Emission Reduction Plan which began in September 2022 and continues for a year-long planning process followed by implementation. As the Environmental Justice Element describes, AB 617 builds off the groundwork laid by East Oakland community leaders, who have urged attention towards air pollution issues in their communities for decades.

**California’s Department of Resources Recycling and Recovery (CalRecycle)** is a department within the California Environmental Protection Agency (EPA) that coordinates the state’s recycling and waste management programs. CalRecycle maintains the Solid Waste Information System (SWIS), a database containing information on solid waste facilities, operations, and disposal sites throughout the State of California.

**The Department of Toxic Substances Control (DTSC)** tracks facilities that are authorized to handle hazardous waste through the EnviroStor database and includes sites such as Federal Superfund (National Priority List) and State Superfund sites, military facilities, voluntary cleanup sites, and school sites being evaluated for possible contamination. The State Water Resources Control Board (SWRCB) maintains the GeoTracker database to regulate leaking underground storage tanks (LUSTs), Department of Defense facilities, spills-leaks-investigations-cleanups, and landfills.

**The California Office of Environmental Health Hazard Assessment (OEHHA)** is the lead State agency for the assessment of health risks posed by environmental contaminants. It assesses the health effects of toxic air contaminants and conducts

research tracking the impacts of climate change on California’s weather, water, ecosystems, agriculture, and public health. The office developed and updates CalEnviroScreen, a screening methodology that can be used to help identify California communities that are disproportionately burdened by multiple sources of pollution.

**The State Water Resources Control Board (SWRCB)** has regulatory responsibility for protecting the water quality of nearly 1.6 million acres of lakes, 1.3 million acres of bays and estuaries, 211,000 miles of rivers and streams, and about 1,100 miles of California coastline. “GeoTracker” is the State Water Board’s Internet-accessible database system used to track and archive compliance data related to authorized and unauthorized discharges. The GeoTracker online database contains regulatory data about leaking underground storage tanks (LUST), Department of Defense, Cleanup Program Sites, spills-leaks-investigations, cleanups, and landfill sites. The GeoTracker database also contains information about public drinking water wells.

**The Bay Area Air Quality Management District (BAAQMD or “Air District”)** regulates toxic air contaminants (TACs) by using a risk-based approach as opposed to establishing a concentrations standard. This risk-based approach utilizes a health risk assessment to determine the specific sources and TACs to control as well as the level of control necessary to reduce risk to acceptable levels. A health risk assessment analyzes exposure to toxic substances and human health risks based on the dose and potency of the toxic substances. In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines (CARB, 2000). Subsequent regulations apply to new trucks and diesel fuel.

The UST Cleanup Fund (Fund) reimburses responsible parties for expenses associated with cleanup of leaking underground storage tanks (USTs), with over 72% of open UST cleanup cases currently receiving financial assistance through the Fund. The Fund also provides money to the Regional Water Boards and local regulatory agencies to abate emergency situations or to cleanup abandoned sites that pose a threat to human health, safety, and the environment, as a result of a UST petroleum release.

<sup>9</sup> California Air Resources Board (CARB), 2019. Cleaner Burning Gasoline: An Update, 2019. Available at <https://ww2.arb.ca.gov/resources/fact-sheets/cleaner-burning-gasoline-update/printable/print>.

**San Francisco Bay Regional Water Quality Control Board** enforces waterway protection and pollution control regulations in Oakland. The primary goal of enforcement is to stop on-going problems and cleanup as necessary to preserve the beneficial uses of the Bay Area's water resources. The SF Regional Water Quality Board operates many programs related to water quality, including a UST cleanup program, to monitor, investigate, and remove pollutant sources.

**The Alameda County Waste Management Authority** provides refuse and recycling collection services for the County of Alameda and is responsible for preparation of the Alameda County Integrated Waste Management Plan and Alameda County Hazardous Waste Management Plan. The Authority manages a long-range program for development of solid waste facilities and offers many programs in the areas of source reduction and recycling, market development, technical assistance, and public education. Funding is provided by per-ton disposal and waste import mitigation fees.

**The Alameda County Department of Environmental Health (ACDEH)** Certified Unified Program Agency (CUPA) coordinates and enforces numerous local, state, and federal hazardous materials management and environmental protection programs in the county. The California Environmental Protection Agency (CalEPA) has designated ACDEH as the CUPA for the City of Oakland. All CUPA programs within the City of Oakland that were previously under the jurisdiction of the City of Oakland have been transferred to ACDEH.

CUPA is the lead program for permitting installations of new UST systems, UST repairs, and UST piping removals within its jurisdiction. ACDEH CUPA inspects over 250 UST facilities annually.<sup>10</sup> ACDEH CUPA ensures that businesses and facilities with ongoing UST operations are properly permitted and meet the monitoring requirements applicable to their type of equipment. ACDEH CUPA staff inspect businesses for compliance with the Hazardous Waste Control Act and applicable regulations and issue permits and inspect businesses that treat hazardous waste.

In addition, businesses storing hazardous materials (including hazardous waste) or extremely hazardous substances at reportable quantities, are required to prepare and electronically submit a Hazardous Materials Business Plan (HMBP). The purpose of the HMBP is to prevent or minimize harm to public health and the environment from a release or threatened release of a hazardous material. Finally, when a facility is closing or ceasing to generate waste, they must notify ACDEH 30 days before the final closure. Large quantity Generators and Tiered Permitting Facilities are required to submit a closure plan for approval.

<sup>10</sup> "Underground Storage Tank Program: Environmental Health Department: Alameda County." Alameda County Department of Environmental Health, <https://deh.acgov.org/hazmat/ust.page>.



GOALS AND POLICIES

**GOAL SAF-5: MINIMIZE HEALTH AND SAFETY IMPACTS RELATED TO THE USE, STORAGE, MANUFACTURE, AND TRANSPORT OF HAZARDOUS MATERIALS.**

**SAF-5.1 Risks from Hazardous Materials Facilities.**

Review proposed facilities that would produce or store hazardous materials, gas, natural gas, or other fuels to identify, and require feasible mitigation for, any significant risks. The review shall consider, at a minimum, the following:

- Presence of seismic or geologic hazards;
- Presence of other hazardous materials;
- Proximity to residential development and areas in which substantial concentrations of people exist, particularly environmental justice communities already overburdened by pollution, including toxic releases from facilities, cleanup sites, groundwater threats/threats from sea level rise, and other sources; and
- Nature and level of risk and hazard associated with the proposed project.

**SAF-5.2 Hazardous Materials.** Through partnerships, programs, and regulations, minimize the potential risks to human and environmental health and safety associated with the past and present use, handling, storage and disposal of hazardous materials.

**SAF-5.3 Site Contamination.** Through enforcement of standard conditions of approval, ensure buildings and sites are or have been investigated for the presence of hazardous materials and/or waste contamination prior to development or if there is reason to believe an existing building or site may contain hazardous materials that pose a threat to possible users. Continue to require remediation and construction techniques for adequate protection of construction workers, future occupants, adjacent residents, and the environment are adequately protected from hazards associated with contamination.

**SAF-5.4 Hazardous Materials Accidents.** Seek to prevent industrial and transportation accidents involving hazardous materials, and enhance the City’s capacity to respond to such incidents. Continue to enforce regulations limiting truck travel through certain areas of the city to designated routes, and consider updating OMC 10.52.010 to establish time-based restrictions on truck travel on certain routes to reduce the risk and potential impact of accidents during peak traffic hours.

**SAF-5.5 Study Options to Provide Financing for the Remediation of Environmentally Contaminated Sites, with Priority for Affordable Projects.** As grant and loan funding sources are secured, support property owners through technical assistance and financing of characterization and/or remediation of environmentally contaminated sites.



## 3.2 OTHER PUBLIC SAFETY AND HAZARD ISSUES

### AIRPORT HAZARDS

The Oakland International Airport (OAK) is owned by the Port of Oakland and is located along the San Francisco Bay, just 10 miles south of downtown Oakland. The Airport is 2,600 acres, including 327 acres of wetlands under jurisdiction of the U.S. Army Corps of Engineers. OAK is a primary commercial service airport with four runways: one primary air carrier runway at South Field and three runways at North Field. The Airport is served by several passenger and cargo airlines. In 2021, Oakland International Airport accommodated 8,142,320 passengers. This is an increase of 76.2 percent from 2020 and a decrease of 39.1 percent from 2019 due to the Covid-19 pandemic.<sup>11</sup>

In 1971, the Alameda County Airport Land Use Commission (ALUC) was created to protect the public health, safety, and welfare by promoting the orderly expansion of airports and adoption of land use measures by local public agencies to minimize exposure to excessive noise and safety hazards near airports. The 2010 Oakland International Airport Land Use Compatibility Plan (ALUCP) is the primary document used by the Alameda County ALUC to help promote land use compatibility between Oakland International Airport (OAK) and its surrounding environments.

The Airport Influence Area (AIA) is defined by the ALUC based on political boundaries, noise contours, and flight tracks. The northernmost boundary of OAK's AIA begins at High Street in the City of Alameda and extends eastward to San Leandro Street. The AIA follows San Leandro Street south until it reaches Lewelling Boulevard in the City of Hayward, where it turns west. The AIA continues to follow Lewelling Boulevard westward until it reaches the Union Pacific Railroad tracks and turns south. The AIA boundary follows the tracks until it turns east on West Winton Avenue, and continues south on Hesperian Boulevard. The AIA turns west on

<sup>11</sup> Oakland International Airport, Press Releases, 2022, <https://www.oaklandairport.com/oak-airport-2021-statistics-release/#:~:text=Annually%2C%20passenger%20traffic%20at%20OAK,8.7%20percent%20from%20last%20year.&text=In%202021%2C%20Oakland%20International%20Airport,of%2039.1%20percent%20from%202019.>

HWY 92 to the San Francisco Bay. The AIA includes portions of the cities of Oakland, San Leandro, Alameda, Hayward, and small unincorporated areas of Alameda County in the vicinity of the Airport, including San Lorenzo, located southeast of the Airport.

The ALUCP establishes a total of seven different safety compatibility zones around the airport, which delineate acceptable land uses in order to minimize the risks to people and property on the ground as well as those people in an aircraft in the event of an accident or emergency landing occurring outside the airport boundary. These zones are:

4. **Zone 1:** Runway Protection Zones
5. **Zone 2:** Inner Approach / Departure Zones
6. **Zone 3:** Inner Turning Zones
7. **Zone 4:** Outer Approach / Departure Zones
8. **Zone 5:** Sideline Zones
9. **Zone 6:** Traffic Pattern Zone
10. **Zone 7:** Other Airport Environs

Each of these zones imposes different development conditions and prohibits certain land uses based on the individual zone's proximity to the airport. The closer the zone is to the airport, the stricter the development conditions are due to the greater the risk of accident and increased noise impacts. For the purposes of the ALUCP, the primary measure of risk exposure for people on the ground in the event of an aircraft accident is based in the number of people concentrated in areas most susceptible to the risk of aircraft accidents.

For new residential land uses, no new dwellings shall be constructed in Safety Zone 1. In Safety Zones 2, 3, 4, and 5, new dwellings are not recommended within the zone boundaries. However, due to the existing urban nature of the surrounding environments and the existing residential land use, infill may be allowed up to an average of the surrounding residential use (except for high density residential), provided that other safety criteria are satisfied. In Safety Zones 6 and 7, residential development is not restricted. These zones are shown in **Figure SAF-11**.

Land uses which pose the greatest concern are those in which the occupants have reduced effective mobility or are unable to respond in emergency situations. Children's schools, day care centers, hospitals, nursing homes, and other uses in which the majority of occupants are children, elderly, and/or people with disabilities shall be prohibited within Zones 1 through 5.<sup>12</sup> See the Oakland International Airport Land Use Compatibility Plan for a full list of compatible land uses within each safety zone.

### PUBLIC SAFETY

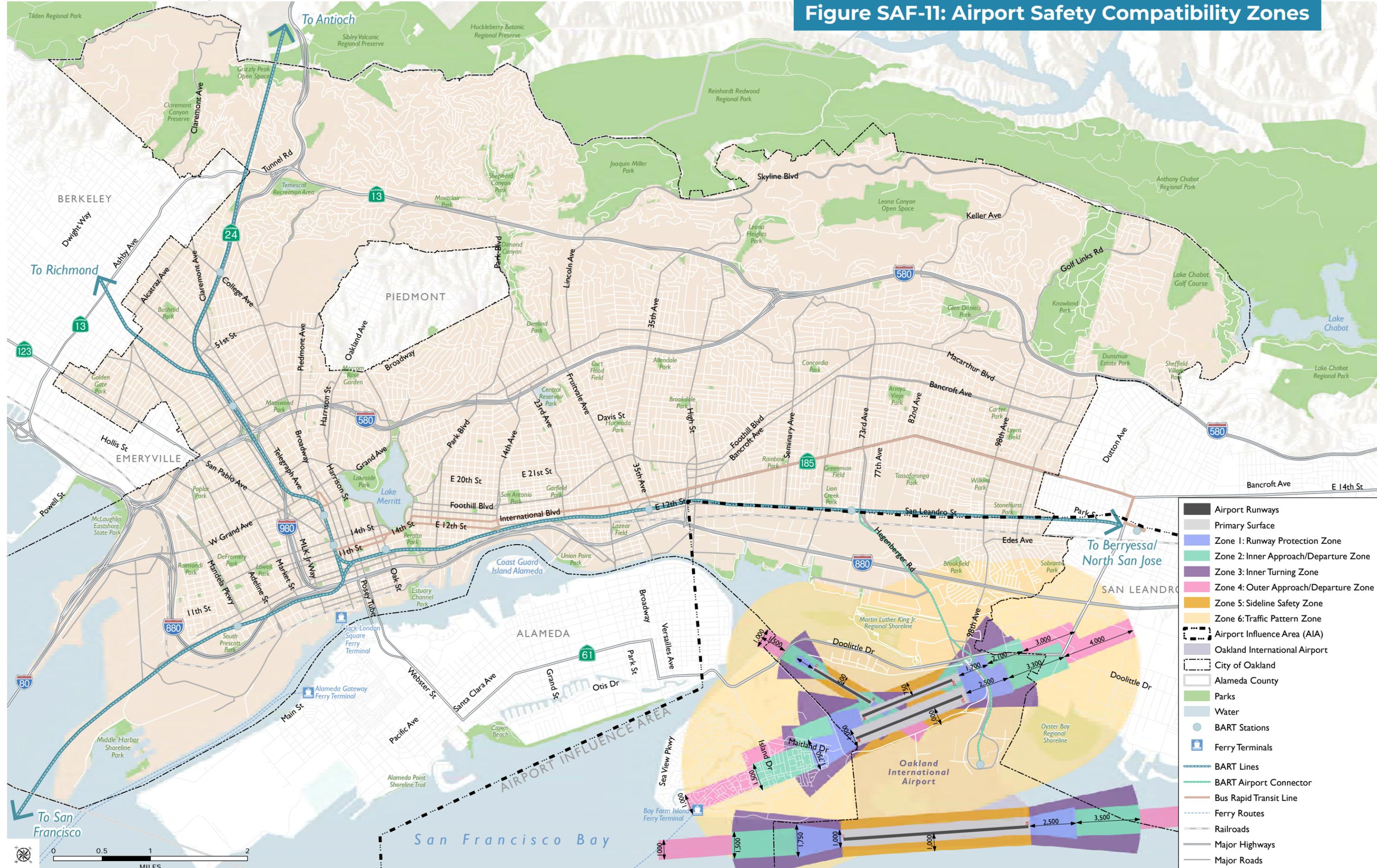
Public safety, perception of safety, and response to crime are complex issues. For example, public safety and crime reduction can be a health issue, with ample evidence showing that access to healthcare, public services, and community violence intervention programs can help reduce crime. Youth who may be at risk of violence are often those who are most disconnected from school, employment, or social connection. Many institutions that are supposed to keep people safe are underlain by systemic racism or may be inherently violent to begin with and have resulted in inequitable or harmful outcomes, especially for Black Oaklanders and people of color.

Violent crime, gun violence, and homicides are particularly impacting the lives of people of color in Oakland, whether they are directly harmed or their ability to feel safe going to school or a park or walking down the street. Of the 12 indicators with the greatest level of racial disparity in the City of Oakland Equity Indicators Report, six were in the category of public safety. With national, state, and local attention on police reform, Oakland communities and City departments are exploring other ways to reimagine and reconstruct the public safety system in Oakland by developing recommendations to increase community safety through alternative responses to calls for assistance, and investments in programs that address the root causes of violence and crime.<sup>13</sup>

<sup>12</sup> Alameda County, Oakland International Airport Land Use Compatibility Plan, December 2010, [https://www.acgov.org/cda/planning/generalplans/documents/OAK\\_ALUCP\\_122010\\_FULL.pdf](https://www.acgov.org/cda/planning/generalplans/documents/OAK_ALUCP_122010_FULL.pdf).

<sup>13</sup> See Oakland's Reimagining Public Safety page: <https://www.oaklandca.gov/topics/reimagining-public-safety> and the Mobile Assistance Community Responders of Oakland (MACRO) Program at <https://www.oaklandca.gov/projects/macro-mobile-assistance-community-responders-of-oakland>

Figure SAF-11: Airport Safety Compatibility Zones



- Airport Runways
- Primary Surface
- Zone 1: Runway Protection Zone
- Zone 2: Inner Approach/Departure Zone
- Zone 3: Inner Turning Zone
- Zone 4: Outer Approach/Departure Zone
- Zone 5: Sideline Safety Zone
- Zone 6: Traffic Pattern Zone
- Airport Influence Area (AIA)
- Oakland International Airport
- City of Oakland
- Alameda County
- Parks
- Water
- BART Stations
- Ferry Terminals
- BART Lines
- BART Airport Connector
- Bus Rapid Transit Line
- Ferry Routes
- Railroads
- Major Highways
- Major Roads

SOURCE: City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2021

The prevalence of violent and property crime, including assault (misdemeanors and felonies), homicide, rape, other sex offenses, burglary, or theft, also negatively impacts the perception of public safety and impedes community connection. Homicides have a devastating effect that extends beyond just the victim to the victim's family, friends, and broader community. As stark racial disparities in violent crimes demonstrate, these effects are not felt evenly across Oakland communities. Residents in majority Hispanic/Latinx tracts experienced the greatest rate of violent crimes per 1,000 people over the five-year period from 2016 to 2020, nearly double the overall average. Moreover, all other racial groups were under the average, with majority white tracts having the lowest rate.

While other documents address issues like safety programming and crime response, the General Plan focuses on the ways that city land use, environments, and community services can create neighborhood environments that feel safe. The General Plan also addresses other contributing factors to safety, including housing and job stability, economic opportunity, access to healthy food, a neighborhood's social connections, and the physical structure/location of health-promoting resources in a community.

### Crime Prevention Through Environmental Design

Crime Prevention Through Environmental Design (CPTED) is a crime prevention philosophy based on the theory that the proper design and effective use of the built environment, can lead to a reduction in the fear of crime as well as an improvement in the quality of life. CPTED works by decreasing a criminal's ability to commit a crime and increasing the chances that the crime will be seen and reported. CPTED goes beyond traditional security



methods by naturally integrating security measures into the community. The goal of all CPTED applications is to increase the quality of life, decrease the fear of crime, and decrease crime.<sup>14</sup> Because different people or groups may have varying perceptions of what makes a community feel safe, CPTED guidelines should be tailored to response to a community's context, diversity and unique safety issues. CPTED principles should also be coupled with acknowledgement of racial profiling that results in disproportionate harm and violence to Black, Indigenous, Latinx, and Asian communities.

The City of Oakland has released guidelines for CPTED in the form of checklists for residential, commercial, and civic projects.<sup>15</sup> Specific criteria include reference to lighting, line of sight, and other visibility issues; clearly defined spaces; and access. For example, building exteriors, parking lots, and parking garages should be well lit. Property lines and private areas should be defined with plantings, pavement treatments, short walls, or fences. Further, landscaping should be maintained and trimmed to avoid creating blind spots or hiding spots. The City of Oakland will continue to apply these CPTED principles in the design of new development in order to enhance public safety and reduce calls for service and will explore opportunities to more intentionally integrate context-specific recommendations in partnership with community.

<sup>14</sup> City of Oakland, 2021. Crime Prevention Through Environmental Design (CPTED). Available at <https://www.oaklandca.gov/resources/crime-prevention-through-environmental-design-cpted>.

<sup>15</sup> Ibid.



### Interagency Coordination, Social Determinants of Health and Crime

Health inequities are differences in health outcomes “that are a result of systemic, avoidable, and unjust social and economic policies and practices that create barriers to opportunities.”<sup>16</sup> Environments where real or perceived violence and crime also affect health. For example, those who grow up and live in environments with limited social, educational, and economic opportunities and where violence, racism, and community and domestic instability are daily stressors are at increased risk of multiple forms of violence.<sup>17</sup> Therefore, in order to prevent violent crime, the City of Oakland needs to address the root causes of social and economic inequalities, as well as the underlying social determinants of health.

In response to systemic inequities that contribute to the underlying causes of public safety issues and crime, the City of Oakland developed the Reimagining Public Safety Taskforce in September 2020. The purpose of the Reimagining Public Safety Taskforce (active from September 2020 through March 2021) is to rapidly reimagine and reconstruct the public safety system in Oakland by developing recommendations for Council consideration to increase community safety through alternative responses to calls for assistance, and investments in programs that address the root causes of violence and crime (such as housing, jobs, etc.) The final report emphasized investment in alternatives in policing through other governmental and community-based organizations. Further, recommendations address the immediate and urgent need to signal to the community and members of the Oakland Police Department (OPD) that, even amidst the consideration of significant organizational change, there will be a doubling down on the commitment to officer accountability, ground zero for public trust and confidence in the Department.

<sup>16</sup> Rudolph, L., Caplan, J., Ben-Moshe, K., & Dillon, L. (2013). *Health in All Policies: A Guide for State and Local Governments*. Washington, DC and Oakland, CA: American Public Health Association and Public Health Institute.

<sup>17</sup> California Department of Public Health, 2020. *Violence and Social Determinants of Health*. Available at <https://www.cdph.ca.gov/Programs/CCDC/DCDC/SACB/Pages/Violence%20Prevention%20Initiative/ViolenceandSocialDeterminantofHealth.aspx>.

**Department of Violence Prevention (Formerly the ‘Oakland Unite’ division of the City of Oakland’s Human Services Department)**

In 2017, the City Council approved the creation of the Department of Violence Prevention (DVP) with the desire to better align, amplify and elevate Oakland’s violence prevention efforts (Ordinance No. 13451 C.M.S.). The DVP focuses on the three forms of violence named in the Safety and Services Act: gun violence, family/domestic violence, and commercial sexual exploitation. The DVP’s public health approach focuses on the root causes of violence -at the individual, peer, family, and community levels- and uses data to understand how frequently violence occurs, when and where it occurs most, and who is most vulnerable of being impacted (both those harmed and those causing harm) and then engages community leaders in the collaborative development of community solutions to prevent violence, promote healing, and restore communities.

The DVP applies this public health approach to:

1. Focus on **specific places** in Oakland **with underlying conditions** that generate the highest rates of violence;
2. Support **specific people** determined to be: at the center of violence, in-risk or at-risk for violence, and exposed/adjacent to violence;
3. Direct interventions to the **individual, peer, family, and community levels**; and
4. Provide services at the **times and days of the week when violence occurs most.**

The DVP focuses efforts with those at the center of violence- who have been harmed and have caused harm- to reduce gun/group/gang and gender-based violence and to support healing in communities exposed to violence to end the cycle of trauma. DVP coordinates with other city departments and the community to apply a citywide, comprehensive strategy to the City’s shared safety approach to violence intervention and prevention. Guided by an explicit equity framework, the DVP prioritizes individuals and communities most impacted by violence and trauma. DVP programs primarily serve the African American and Latinx community between 14-35 years old. The DVP’s strategic interventions

are framed within a trauma-informed approach that focuses on healing and deep, long-term relationships with trusted service providers and advocates.

Additionally, the DVP and its funded agencies respond to all shootings and gun-related homicides across the city (Triangle Incident Response) to provide support to victims, families, and community members. Beginning in Spring 2021, the Triangle Incident Response is a 24/7 real-time, coordinated crime scene response that aims to reduce retaliatory group/gang related violence, reduce the levels of trauma experienced by individuals, families, and impacted community members, and improve police-community relationships. The triangle partners, staffed by professionals with different orientations and responsibilities, include: a) violence interrupters, b) DVP Crime-scene Response Advocates with expertise in crisis intervention principles, and c) law enforcement with knowledge of the geographic areas in which the triangle is implemented. The expertise of all three partners is equally valued. Crime-scene Response Advocates are DVP staff members who provide immediate support for family and peers, as well as communication and coordination of DVP Violent Incident Crisis Response efforts.

The DVP also hosts community Town Nights events at parks across the city in areas that experience a high level of violence. Town Nights is a community-driven, multi-generational violence prevention and intervention strategy that involves outreach to community members, employment opportunities, free recreational activities and food, and violence interruption dialogues facilitated by violence interrupters and community engagement teams, those with lived experience and familiarity in neighborhoods of focus that share outreach messages and service connections. Though not causal, analysis indicates that there may be a relationship between days when Town Nights events occur and a reduced number of shootings with injury.

At the June 29, 2022 City Council meeting, Council approved approximately 60 grant agreements with over 30 non-profit and public agencies for Fiscal Year 2022-2023 to serve an estimated 11,775 people at the center of, at risk, and exposed to violence in Oakland. **Table SAF-4** describes the strategies, sub-strategies, and activities funded for Fiscal Year 2022-2023, including the number of awards and the amount of funding allocated.

**Responsible Agencies**

There are several other agencies responsible for public health and public safety in the Bay Area. This Element emphasizes interagency coordination and planning efforts between the City of Oakland and the following agencies to best prioritize public health and safety in the face of environmental inequities, airport

**Table SAF-4: DVP Grant Awards Fiscal Year 2022-2023**

STRATEGY AREA/ SUB-STRATEGY	# AWARDS	FUNDING
<b>Gun/Group/Gang Violence Response</b>		
Violent Incident Crisis Response	8	\$3.1 million
Youth Diversion And Youth And Adult Life Coaching	11	\$3.2 million
Youth And Adult Employment & Education Support Services	7	\$1.8 million
School-Site Violence Intervention And Prevention Teams	7	\$2.4 million
Subtotal	33	\$10.5 million
<b>Gender-Based Violence Response</b>		
Crisis Response	3	\$900,000
Housing	4	\$1.1 million
Wraparound Services	8	\$2.4 million
Subtotal	15	\$4.4 million
<b>Community Healing And Restoration</b>		
Neighborhood And Community Teams With Town Nights	6	\$2.4 million
Healing/Restorative Activities	4	\$1 million
Therapeutic Supports	1	\$200,000
Community Capacity-Building And Mini-Grants	2	\$850,000
Subtotal	13	\$4.5 million
<b>Grand Total</b>	<b>61</b>	<b>\$19.4 million</b>

hazards, crime, and other community stressors. In addition, the City aims to closely consult and coordinate with community-based organizations in order to best engage residents about public health and safety measures. Such community groups may include the West Oakland Environmental Indicators Project, Oakland Climate Action Coalition, HOPE Collaborative, East Oakland Collective, Communities United for Restorative Youth Justice, and Youth UpRising.

**The California Department of Public Health** contains the Emergency Preparedness Office, which maintains and manages the Medical and Health Coordination Center, distributes funds to local health departments for disaster planning, and operates the California Health Alert Network. The Department also manages the Climate Change & Health Equity Program, whose goal is to systematically integrate work from climate change planning and public health planning with policies and principles that promote equity. The Department works with local, State, and national partners to assure that climate change mitigation and adaptation activities have beneficial effects on health while not exacerbating preexisting health disparities.

**The Alameda County Sheriff's Office** is a full-service law enforcement agency accredited through the Commission on

Accreditation for Law Enforcement Agencies (CALEA) and the American Correctional Association (ACA). The mission of the Sheriff's Office is to enforce the law fairly without bias, commit to professionalism, service the community with integrity and trust, and oblige to duty with honor and pride.

**The BART Police Department** is actively focused on implementing progressive and equitable policing practices. Their mission is to ensure a safe environment within our transit system, reduce crime through a highly visible police presence, and proactive enforcement of the law, and to promote public confidence by working in partnership with stakeholders and the communities they serve.

**The Port of Oakland** owns the Oakland International Airport. Under the direction of the Port Commission, the Port has broad regulatory authority over trust lands granted pursuant to the Burton Act. The Port has its own land use and development code and oversees the permitting of new construction and rehabilitation projects in its jurisdiction. Jurisdictional authority of the Port includes 20 miles of waterfront, and includes ground, commercial, retail, office, industrial, and maritime industrial leases, and landmarks such as Jack London Square.

## GOALS AND POLICIES

### GOAL SAF-6: PROTECT OAKLANDERS FROM AIRPORT LAND USE HAZARDS.

**SAF-6.1 ALUCP Updates.** Periodically review and coordinate with the Oakland Airport Land Use Commission on updates and modifications to ALUCPs conducted for airport facilities within Alameda County.

**SAF-6.2 Land Use Compatibility.** Require land uses surrounding the Oakland International Airport to be compatible with the operation of the airport and restrict development of potentially hazardous obstructions or other hazards to flight. Discourage uses that may impact airport operations or do not meet Federal or State aviation standards.

### GOAL SAF-7: FOSTER FEELINGS OF SAFETY IN ALL OAKLAND NEIGHBORHOODS.

**SAF-7.1 Reimagining Public Safety.** Support recommendations made in Oakland's Reimagining Public Safety program, including through land use policies that promote more housing, living wage jobs, revitalization of commercial corridors, improved access to healthy food facilities, restorative justice centers, civic engagement, and arts and culture.

**SAF-7.2 Crime Prevention Through Environmental Design.** Continue to apply Crime Prevention through Environmental Design principles in the design of new development and encourage the provision of adequate public lighting; windows overlooking streets or parking lots; and paths to increase pedestrian activity within private development projects and public facilities in order to enhance public safety and reduce calls for service.





## 4. Emergency Preparedness and Response

This section includes information about the City's Emergency Preparedness and Response programs, agencies, and operations. It also provides information on Oakland's emergency alert systems, an analysis of evacuation routes, and describes current capital improvement needs relevant to emergency preparedness and response. Goals and policies developed by the City will work to address the needs of all Oakland residents during times of emergency, prioritizing support for socially vulnerable groups through emergency response programs and preparedness strategies that account for Oakland's diverse population.



### 4.1 EMERGENCY PREPAREDNESS AND RESPONSE

#### EXISTING PROGRAMS, AGENCIES, AND OPERATIONS

The Oakland Fire Department is the primary emergency response service provider for the city and provides comprehensive strategies and training in fire prevention, fire suppression, emergency medical services, emergency preparedness, 911 services, and community-based fire services. Through Communities of Oakland Respond to Emergencies (CORE), the Oakland Fire Department provides free emergency preparedness and response training for individuals, neighborhood groups, and community-based organizations in Oakland. Similarly, the Fire Department also offers Community Emergency Response Training (CERT) programs, which train volunteers in basic disaster response skills. OFD operates 25 fire stations throughout the City (shown in [Figure SAF-12](#), along with other emergency service infrastructure and existing municipal resilience hubs) and employs approximately 500 sworn full-time fire fighters. The OFD aims to provide emergency service within seven minutes of notification

90 percent of the time—this emergency response time can be met in all areas located within 1.5 miles of a fire station.

The Emergency Management Services Division (EMSD) exists within the Oakland Fire Department and is the primary agency responsible for responding to, recovering from, and mitigating any hazard that affects the City of Oakland. In 2021, EMSD updated the Emergency Operations Plan (EOP), a document providing a roadmap for emergency response personnel in performance of their duties before, during, and through initial emergency recovery. The EOP also provides a comprehensive overview of the roles and responsibilities of City departments in the event of an emergency, as well as plans for coordination between city, county, state, and federal agencies.

EMSD also administers the development of the Local Hazard Mitigation Plan, which is updated every five years and was most recently published in 2021. The 2021-2026 LMHP is intended to serve as a guide to increase Oakland community's resilience in the face of natural disasters, such as earthquakes, floods, extreme heat, and fires, and proactively prepare the community for emergency events. The LMHP also provides an assessment of risk from a variety of hazards and proposes strategies for mitigation and adaptation.



### Terrorism

The Federal Bureau of Investigation (FBI) defines terrorism as “the unlawful use of force or violence committed by a group or individual against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.” It could also include use of weapons of mass destruction, cyber terrorism (communications and information systems), or agroterrorism (disruption to food supplies). In April 2021, the City of Oakland prepared a Terrorism Annex to the Emergency Operations Plan to facilitate an effective local response to a terrorist attack on the city. As part of the next update of the Integrated Preparedness Plan and LHMP, the City will incorporate policy recommendations from the Terrorism Annex to protect against potential terrorist attacks.

### Public Health Crises

Climate scientists and public health experts warn that climate change will increase the risk of infectious disease transmission and potential pandemics.<sup>1</sup> The COVID-19 pandemic has demonstrated the indispensable role of cooperation and coordination across a wide range of sectors, including city departments, public organizations, businesses, nonprofits, and the community, in effectively responding to and planning for future public health emergencies.

In the event of a public health emergency, the coordination and acquisition of medical/health mutual aid resources involves federal, state, and local agencies as well as the private sector (hospitals, medical supply vendors, ambulance companies, etc.). The Oakland Fire Department and Oakland Department of Human Services will work with the Alameda County Department of Public Health to coordinate medical and health responses.

At the State level, the California Governor’s Office of Emergency Services (Cal OES) responds to and aids in the recovery from emergencies within the State of California under the authority of the California Services Act, California Disaster Assistance Act, and the Stafford Act. Cal OES is responsible for managing disaster recovery and aiding local governments, special districts, certain

<sup>1</sup> National Science Foundation. (2022). Study finds that climate change could spark the next pandemic <https://beta.nsf.gov/news/study-finds-climate-change-could-spark-next>

nonprofit organizations, individuals, businesses, and agricultural communities impacted by disasters.

The California Department of Public Health contains the Emergency Preparedness Office, which maintains and manages the Medical and Health Coordination Center, distributes funds to local health departments for disaster planning, and operates the California Health Alert Network. The Department also manages the Climate Change & Health Equity Program, whose goal is to systematically integrate work from climate change planning and public health planning with policies and principles that promote equity. To plan for an effective, coordinated response, the City is also preparing a Pandemic Annex of the Emergency Operations Plan, which provides an overview of considerations for City response to a global pandemic affecting the Bay Area. One of the key assumptions of any pandemic planning model is that vulnerable populations, including people of color, will tend to experience worse health outcomes because of historic and current impacts of systemic racism. As part of the next update of the Integrated Preparedness Plan and LHMP, the City will incorporate the best available data on racial disparities and policy recommendations from the Pandemic Annex to keep Oaklanders safe and healthy.

## COMMUNITY RESILIENCE AND RESPONSE

The 2045 General Plan Update is an opportunity to enhance community resilience for all Oakland communities with policies in support of ECAP innovations. For example, the ECAP includes Action A-1, Fund the Creation and Operation of Resilience Hubs, as key to successful climate adaptation. Other tools to strengthen community resilience and safety include emergency power sources to rely on in the event of power outages, accessible emergency alerts and information systems, and improved evacuation strategies and routes that reach all Oakland communities. The General Plan Update will incorporate these ECAP recommendations into its goals and policies to ensure their implementation.

### Resilience Hubs

Resilience hubs are defined as “community-serving facilities that support residents year-round and support resource distribution and onsite services before, during, or after a natural hazard event.” General Plan policies will further support resilience hubs to protect frontline communities during climate crises, earthquakes

## Building Resilience: Oakland’s 2030 Equitable Climate Action Plan (ECAP)

The ECAP illustrates Oakland’s approach to equity in building climate resiliency. It identifies ambitious actions to combat climate change while also ensuring that frontline communities – those that have been harmed by environmental injustice and who are likely to be hurt first and worst by the impacts of climate change – will benefit first and foremost from climate action. The accompanying Racial Equity Impact Assessment and Implementation Guide supports equitable implementation of the ECAP by providing in-depth guidance for City staff in each 2030 ECAP implementing department in order to maximize equitable outcomes, including robust frontline community participation.



or other shocks, and chronic stressors. Resilience hubs address the unique cultural and situational needs of the communities in which they are located. They also provide critical disaster preparedness, response, and recovery functionalities. Minimum characteristics include all-electric buildings with microgrids (onsite renewable and backup electricity with islanding capability), refrigeration, gathering and shelter capacity, emergency communications, and cooling and air filtration.

Resilience-building policies will also support companion approaches, such as expanding green infrastructure to mitigate flood hazards and urban heat islands, protecting key facilities to ensure community energy resilience, and adaptively reusing structures to create indoor spaces resilient to climate change impacts.

Communities and community-based organizations have been a mainstay of local resilience and adaptive capacity in Oakland. The General Plan offers an opportunity for the City to identify and partner with these communities, organizations, and networks by funding and otherwise supporting community-based resilience hubs to enhance the adaptive capacity and resilience of vulnerable groups and reach a broader and more diverse network of Oakland residents.

**Essential Public Facilities**

Public facilities operated by the City such as libraries, senior centers, cultural centers, parks, and recreational centers may function as essential service facilities and play an important role in emergency response as resilience hubs, respite centers, and local assistance centers. These essential public facilities also play an important role as neighborhood hubs where Oakland residents can go to build and strengthen community networks.

Currently, the Alameda County Office of Emergency Services publishes information on cooling centers, clean air facilities, and warming centers open to the public in Alameda County on its website. Generally, public respite facilities are identified as need arises, such as in the event of a heat wave, and at present, these facilities are not located according to a geographic assessment of vulnerability. Community inclement weather respite facilities in public buildings are located throughout the city, such as libraries and recreation centers. **Table SAF-5** lists public air-conditioned

**Table SAF-5: Public Air-Conditioned Facilities**

FACILITY NAME	ADDRESS
81st Ave Branch Library	1021 81st Avenue Oakland, California 94621
Asian Branch Library	659 14th Street Oakland, California 94612
Brookfield Branch Library	9255 Edes Avenue Oakland, California 94603
César E. Chávez Branch Library	3301 East 12th Street, Suite 271 Oakland, California 94601
Dimond Branch Library	3565 Fruitvale Avenue Oakland, California 94602
Eastmont Branch Library	7200 Bancroft Ave., Suite 211 Oakland, California 94605
Piedmont Ave. Library	80 Echo Avenue Oakland, California 94611
Rockridge Branch Library	5366 College Avenue Oakland, California 94618



facilities, which residents are encouraged to visit during extreme heat events. A data driven approach is recommended during the placement of future respite facilities to equitably distribute supportive resources to Oakland communities.

**Emergency Power**

Due to increased wildfire risk, Pacific Gas and Electric (PG&E), Oakland's public utility electricity transmission and distribution as well as gas provider, has instituted Public Safety Power Shutoffs (PSPS) and Enhanced Power Safety Shutoffs (EPSS) when forecasts indicate the potential for extreme weather and wildfire risk. Although PG&E endeavors to provide multiple days' notice and warning to those who may be affected, these events are still disruptive to many residents, especially in rural areas of the unincorporated county. Power outages may be especially hazardous to residents who use prescribed medications and treatments that rely on electricity and refrigeration and may exacerbate food insecurity due to lack of refrigeration.<sup>2</sup>

In 2016, Alameda County and 11 of its cities, including Oakland, entered into a Joint Powers Agreement to launch East Bay Community Energy (EBCE), an independent public agency. EBCE secures electrical energy supply for residents and businesses and leads energy-related climate programs, including transportation electrification. As the nonprofit public power provider, EBCE delivers electricity with high renewable energy content, at a reduced cost to customers, through PG&E's transmission and distribution system.<sup>3</sup>

To mitigate the effects of power outages, East Bay Community Energy (EBCE) is exploring the feasibility of solar and/or battery backup systems at critical municipal facilities in Alameda County. The goal of this project is to enable EBCE and its local government partners to better support the community during a grid outage. The project is intended to equip critical facilities, resilience hubs, respite centers and other facilities that support vulnerable populations such as low-income, medically dependent, and elderly populations with onsite renewable energy and storage capacity. Additional energy saving measures, such as the

2 LA County Climate Vulnerability Assessment. Oct. 2021. <https://ceo.lacounty.gov/wp-content/uploads/2021/10/LA-County-Climate-Vulnerability-Assessment-1.pdf>

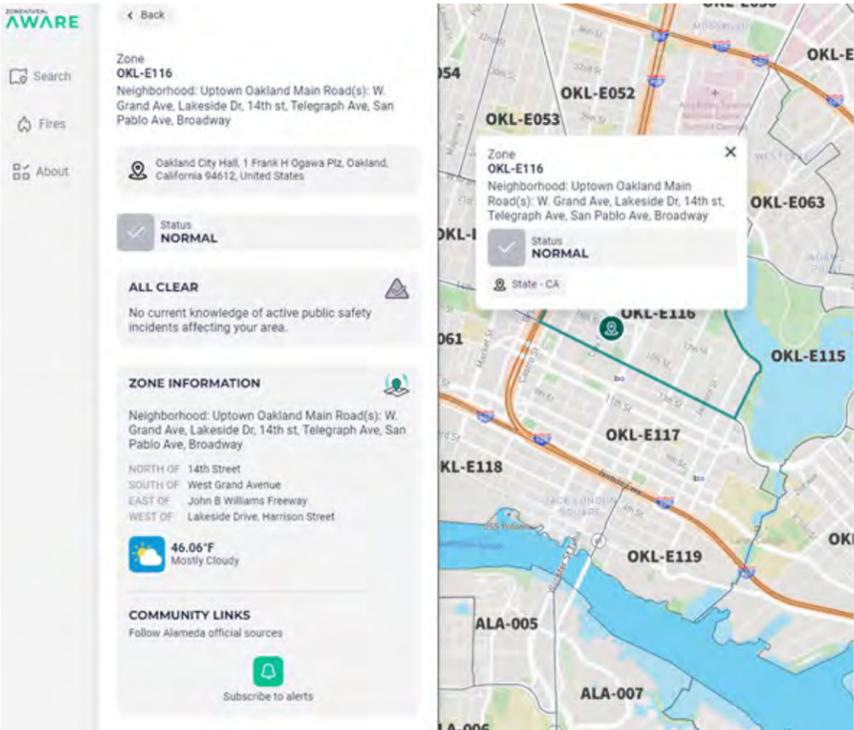
3 Zero Emission Vehicle Action Plan." City of Oakland, <https://www.oaklandca.gov/projects/zero-emission-vehicle-action-plan>. Accessed 9 Sept. 2022.

installation of heat-pumps rather than stand-alone AC units, help conserve energy and reduce strain on the electricity grid in addition to reducing greenhouse gas emissions.

**ALERTS AND EVACUATION**

Evacuation procedures are most effective when residents are aware of the emergencies that are most likely to affect them and have ample time and support to prepare their own emergency plans. The City of Oakland, in conjunction with Alameda County, has a variety of systems and procedures in place to protect residents and visitors to plan for, avoid, and respond to a hazard event. Emergency alert and assistance systems include city-wide emergency sirens, fire and law enforcement vehicle loudspeakers, emergency response phone numbers such as 9-1-1, agency websites, and digital tools.

In 2021, the City of Oakland launched an evacuation software system called Zonehaven, to provide residents with real-time maps and information online to guide evacuation in the event of an emergency. AC alert, the Mass Notification System used by City and County agencies throughout Alameda County, rapidly disseminates emergency alerts to people who live, work in, or



visit Alameda County. AC Alert can send alerts by voice, text, and email, as well as messaging Nixle subscribers, posting to social media pages, and sending FEMA Wireless Alerts (WEA).

**Equitable Response, Notifications, and Preparation**

Local hazard mitigation and emergency response policies should be tailored to the needs of the communities they serve. Some populations are at greater risk from hazard events because of decreased resources or because they have a disability.<sup>4</sup> Linguistically isolated households (residents who do not speak or read English as a first language or at all) may not hear or understand important information when there is an emergency like a fire, earthquake, or extreme heat waves. Persons with disabilities may require communications in alternative, accessible formats to ensure effective communication- particularly individuals who are deaf or hard-of-hearing, blind or low-vision, or those with intellectual disabilities. Additionally, lack of familiarity with local government and planning processes may present barriers to community engagement and accessing key government-provided resources.<sup>5</sup>

Some of the most direct means of access to emergency operations and response information are available to residents through online resources. However, 94,000 residents in Oakland currently do not have access to the internet and may be at a disadvantage during emergency events. According to the 2018 Equity Indicators Report, Black individuals were the most likely to not have high speed internet access at home (40.8 percent), followed by Hispanic/Latinx individuals (33.5 percent). White individuals were least likely to lack high speed internet access at home (14.6 percent).<sup>6</sup>

Participation in emergency response training programs such as CORE and CERT is another important way for communities to build resilience and adaptive capacity. However, low-income

4 2021 Local Hazard Mitigation Plan [LHMP]." *City of Oakland*, <https://www.oaklandca.gov/topics/2021-local-hazard-mitigation-plan>. Accessed 9 Sept. 2022.

5 Thomas, K., Hardy RD., Lazrus H., Mendez M., Orlove B., Rivera-Collazo, I., Roberts JT., Rockman M., Warner BP., Winthrop R., Explaining differential vulnerability to climate change: A social science review (December 2018). Oct 29 2019: <https://onlinelibrary.wiley.com/doi/full/10.1002/wcc.565>.

6 2018 Oakland Equity Indicators Report." *City of Oakland*, <https://www.oaklandca.gov/documents/equity-indicators-community-briefing-documents>. Accessed 9 Sept. 2022.

residents with limited free time, linguistically isolated residents, and residents who may lack familiarity with government processes may be unable to participate in emergency preparedness training programs. A more detailed discussion of barriers to participation is provided in the Environmental Justice Element.

**Emergency Evacuation**

Evacuation occurs only when a serious threat to public safety exists. The Oakland Fire and Police departments are responsible for the authorization, direction, routing, and relocation of people from their homes, schools, and places of business. During emergency evacuations, these departments will coordinate transportation support for evacuated populations as well as populations with disabilities and others with access or functional needs. The City is committed to providing specialized supports to these populations during emergency evacuations and mass shelter scenarios and should ensure compliance with all City plans that take these needs into account.<sup>7,8</sup> Public transit agencies will also play a role in emergency evacuation strategies. According to the Emergency Operations Plan, the Oakland Department of Transportation (OakDOT) will be responsible for traffic restrictions, civilian transportation support, transportation safety, and coordination with the transportation industry (federal, state, and local, including private and public).

The I-580, I-880, and I-980 are the primary regional routes in Oakland. In a disaster, they would be assessed first for damage and debris, as they are the main arteries moving resources throughout the region. Secondary routes, mainly state roads and larger roadways, enable flow of resources to the City. Primary and secondary local routes, as well as the overall local street network, are identified in **Figure SAF-13a**. Recent investigations utilizing modeling software have shown that current road and intersection capacity is not adequate for the existing population in the event of a mass evacuation.<sup>9</sup> Additionally, city infrastructure surveys have shown

7 <https://oaklandca.s3.us-west-1.amazonaws.com/w/DOWD007854.pdf>

8 [file:///Users/emilyseelenfreund/Documents/EOP-v4-Council-DRAFT\\_20211112.pdf](file:///Users/emilyseelenfreund/Documents/EOP-v4-Council-DRAFT_20211112.pdf), 3.11. Compliance with the Americans with Disabilities Act Addressing the Needs of Individuals and others with Access and Functional Needs

9 2045 General Plan Update: Oakland Map Atlas, 2022 [https://cao-94612.s3.amazonaws.com/documents/Map-Atlas\\_Revised.pdf](https://cao-94612.s3.amazonaws.com/documents/Map-Atlas_Revised.pdf)

**Figure SAF-13a: Emergency Assessment, Primary and Secondary Routes**



<b>Priority Routes</b>	BART Stations
Regional Route	Ferry Terminals
Local Route - Primary	BART Lines
Local Route - Secondary	BART Airport Connector
Oakland Street Network	Bus Rapid Transit Line
Parks	Ferry Routes
	Railroads
	Major Highways
	Major Roads
	City of Oakland
	Port of Oakland
	Alameda County

SOURCE: City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2021

that many streets in the VHFHSZ in the Oakland Hills are not built to current Municipal Code Standards and have narrow streets with dead ends that only allow for one route of escape. Because many streets in the hills are in steep areas without off-street parking, many residents park on the street making the streets even narrower and less accessible for emergency responders. Considering these factors, conditions related to emergency response and evacuation are currently inadequate to serve the population living in the VHFHSZ. Illustrated in **Figure SAF-13b**, almost all the residential parcels with limited access for evacuation are in the Oakland Hills. Similarly, most of the residential parcels located in high hazard areas are also located in the hills, where fire risk is greatest in Oakland. There are also a small number of residential parcels located along the estuary shoreline in the Coliseum area and near flood zones adjacent to creek channels where residents may have limited evacuation access.

Additional traffic volumes could be expected with the construction of more housing anywhere in fire-threatened areas of the city. To assess constraints on roadway capacity, several scenarios, including three wildfire scenarios, modeled the expected weekday afternoon peak-hour roadway congestion. While much congestion occurs as part of regular commuting, the model determined that fire-related evacuation traffic would have an impact on area roadways. **Table SAF-6** summarizes the main roadways that would be congested or over-capacity under each scenario. Impacted roadways are shown in red in **Figures SAF-13c** through **13f**. While specific actions to keep evacuation routes clear during an emergency are largely dependent upon the circumstances of the event, there are a number of general actions that the City may take. The City must also balance identification of emergency access route improvements to ensure they do not negatively affect traffic, bicyclist, and pedestrian safety under regular operating conditions. Infrastructure-related strategies can aid in efficient and expeditious flow of evacuation traffic, which is the most critical and challenging element in a successful evacuation and are described in the callout box to the right.

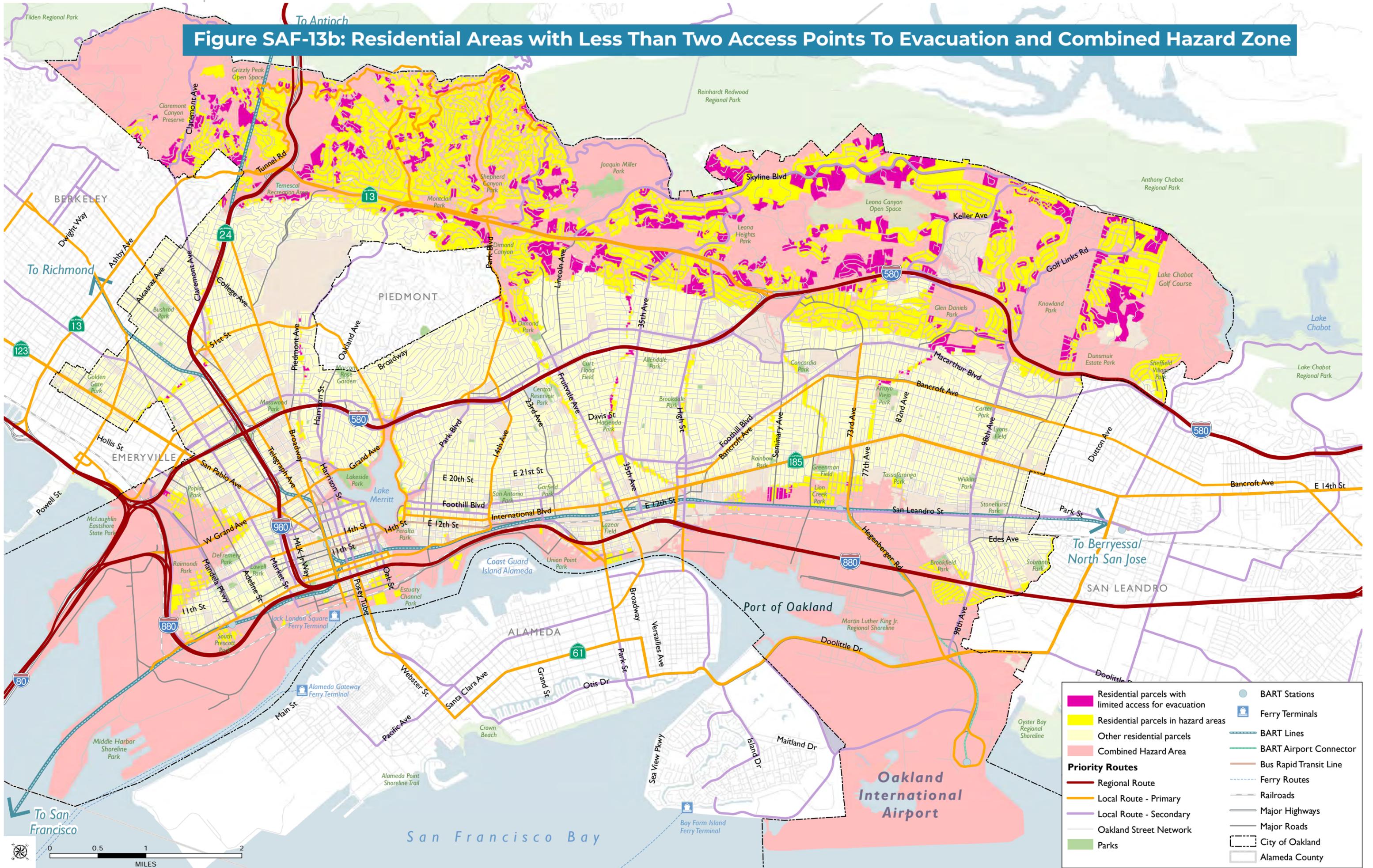
## ROADWAY MANAGEMENT

Strategy	Description and Outcome
Limited/Unlimited contra flow on highways	Reverse one or more lanes of highway to accommodate an increased flow of traffic in one direction, or redirect all lanes of a designated evacuation route to accommodate rapid evacuation.
Limited/unlimited contra flow on unlimited access arterials	Temporarily close inbound travel lanes on selected unlimited access arterials (such as parkways and boulevards) to allow outbound traffic to utilize these lanes during evacuation.
Phased releases as major parking centers	Implement a coordinated release of evacuation traffic from parking facilities that would reduce congestion on evacuation routes, especially in the downtown area. A phased release protocol would be developed for each parking facility, depending on size, location, and other relevant factors.
Closure of inbound lanes	Close inbound lanes on highways utilized for evacuation routes to prevent drivers on these routes from entering the City while evacuation is underway.
Restrict left-turn movements	Minimize left-turn movements along evacuation routes/roads leading to evacuation routes.
Signage	Use variable message board equipment and targeted installation of permanent dynamic message signs on evacuation routes to improve communication and reduce public confusion.
Stage tow trucks	Stage tow trucks at key bottleneck locations along evacuation routes to help detect and clear minor crashes and maintain traffic flow.
Adjust signal timing	Increase the green time and/or progression band for through movements leading out of an evacuation zone.
Signal operation during power outage	Install signal battery backups in case signal operations need to be maintained during a power outage. Consider using channeling devices, static signs, and coning strategies to manage intersection flow during power outage if the signals lack power.
Additional access routes	Identify and communicate with communities that have at least two access points. Prioritize adding additional access to communities which are currently served by only one or two access points.
Bus system	Develop transportation solutions such as the use of a bus system for evacuating individuals with special needs (such as those with mobility limitations).
Traffic control points	Establish traffic control points (i.e., locations along designated evacuation routes with emergency management personnel) to maintain a greater degree of evacuation management. These locations could enhance the efficiency of an evacuation, reduce public confusion, and allow increased operational flexibility during an evacuation.

**Table SAF-6: Summary of Roadway Congestion and Over-Capacity Conditions under Wildfire Scenarios in Evacuation Zones (2030)**

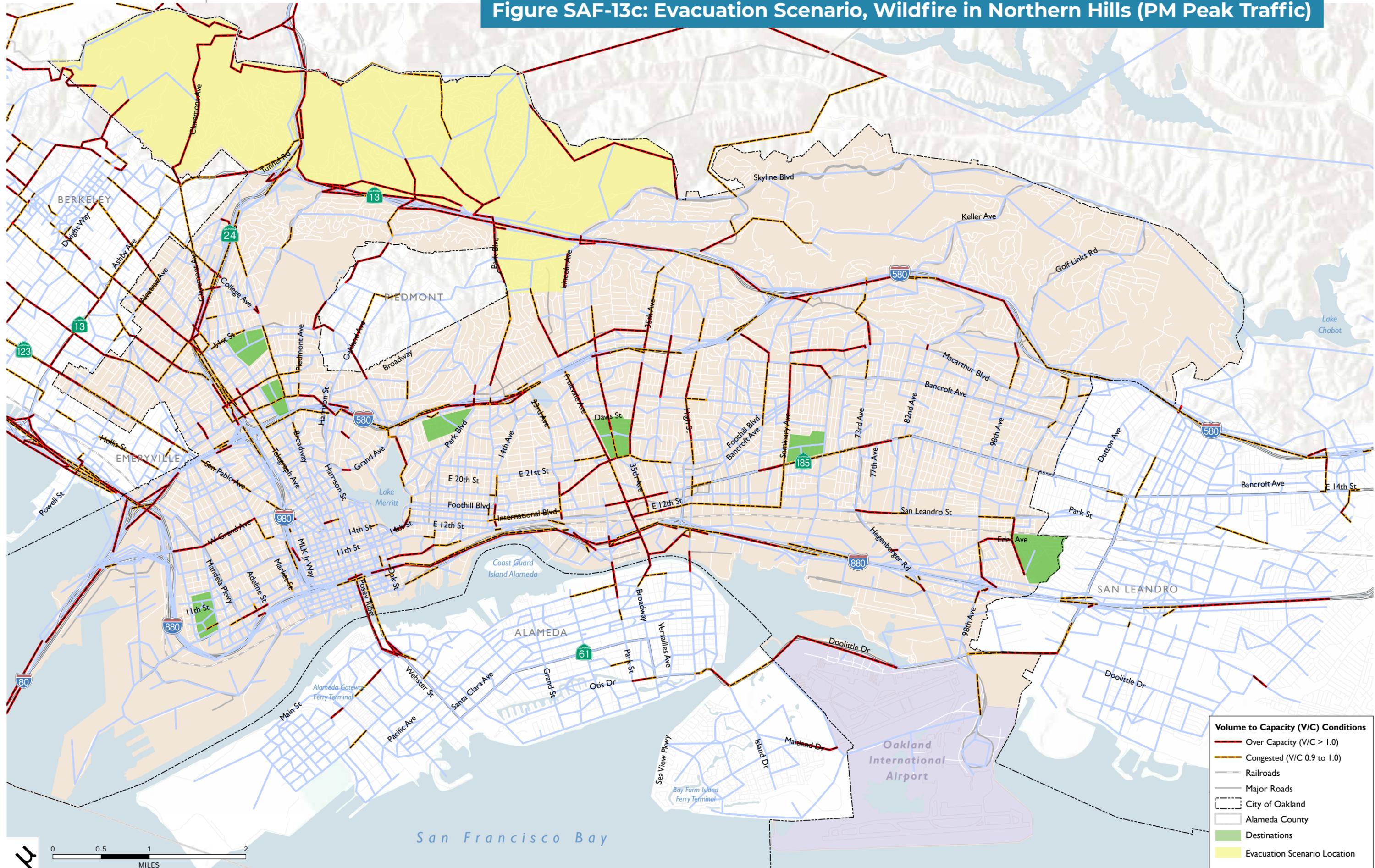
Normal Commute Peak-Hour Congestion	Northern Hills Wildfire Evacuation Scenario: Peak-Hour Congestion/Evening Congestion	Central Hills Wildfire Evacuation Scenario: Peak-hour Congestion	South Oakland Hills Wildfire Evacuation Scenario Peak-Hour Congestion
<ul style="list-style-type: none"> <li>• Southbound I-880 (towards San Jose)</li> <li>• Southbound I-580 (towards Dublin and San Ramon)</li> <li>• Southbound I-80 (from Berkeley towards Oakland)</li> <li>• Fruitvale Avenue, between International Boulevard and MacArthur Boulevard</li> <li>• Northbound SR 24 between Telegraph Avenue to Broadway</li> <li>• Parts of SR 13 between Lincoln Ave and SR 24</li> <li>• Tunnel Road</li> <li>• West Grand Avenue, between Market Street and Frontage Road</li> <li>• High Street, between Foothill Boulevard and MacArthur Boulevard</li> </ul>	<p><b><u>Peak PM Congestion</u></b></p> <ul style="list-style-type: none"> <li>• Lincoln Avenue, from Alida Street to Lincoln Way</li> <li>• Claremont Avenue, from Tanglewood Road to Grizzly Peak Boulevard</li> <li>• Grizzly Peak Boulevard, from Scotts Peak Trailhead 0.4 mi. S of SR-24</li> <li>• Centennial Drive, from Lower Fire Trailhead to 1300 feet E of Stadium Rim Way</li> <li>• Mountain Boulevard, from La Salla Road to Broadway Terrace</li> <li>• SR-24, from Grizzly Peak Boulevard to SR-13 intersection</li> <li>• Moraga Avenue, from Thornhill Drive to La Salla Avenue</li> <li>• Skyline Boulevard, from Burton Avenue to Joaquin Miller Road</li> <li>• Broadway Terrace, from Mountain Boulevard to Pinewood Road</li> <li>• SR-13, from Thornhill Drive to SR-24/Grizzly Peak Boulevard</li> <li>• Snake Road, from Shepherd Canyon Road to Colton Boulevard</li> <li>• Snake Road/Shepherd Canyon Road, from Mountain Boulevard to 1,000 feet east of Snake Road</li> </ul> <p><b><u>Nighttime Congestion</u></b></p> <ul style="list-style-type: none"> <li>• Claremont Avenue, from Tanglewood Road to Alvarado Road</li> <li>• Grizzly Peak Boulevard, from Fish Ranch Road to 0.4 mi. south of SR-24</li> <li>• Centennial Drive, from Lower Fire Trailhead to 1300 feet E of Stadium Rim Way</li> <li>• Monterey Boulevard, S of Park Boulevard</li> <li>• Moraga Avenue, from Thornhill Drive to La Salla Avenue</li> <li>• Skyline Boulevard, from Burton Drive to Joaquin Miller Road</li> <li>• SR-13, parallel to Glenwood Glade</li> <li>• Mountain Boulevard, from Pinewood Road to La Salla Avenue</li> <li>• Snake Road, from Armour Drive to Skyline Boulevard</li> <li>• Thornhill Drive, between Moraga Avenue and Gouldin Road</li> </ul>	<ul style="list-style-type: none"> <li>• SR-13, from Carson Street to Mountain Boulevard</li> <li>• Joaquin Miller Road, from Mountain Boulevard to Butters Drive</li> <li>• Campus Drive, from Keller Avenue to Redwood Road</li> <li>• Keller Avenue, from Greenridge Drive to Campus Drive</li> <li>• I-580, from Seminary Avenue to Edwards Avenue/Leona Drive</li> <li>• Edwards Ave, from Hillmont Drive to Sunnymere Avenue</li> <li>• Mountain Boulevard, from SR-13 off-ramp to Kearney Avenue</li> </ul>	<ul style="list-style-type: none"> <li>• Malcolm Avenue, from 106th Avenue to Leamont Court</li> <li>• I-580, from Golf Links Road to 106th Avenue</li> <li>• 98th Avenue, from MacArthur Boulevard to Golf Links Road</li> </ul>

**Figure SAF-13b: Residential Areas with Less Than Two Access Points To Evacuation and Combined Hazard Zone**



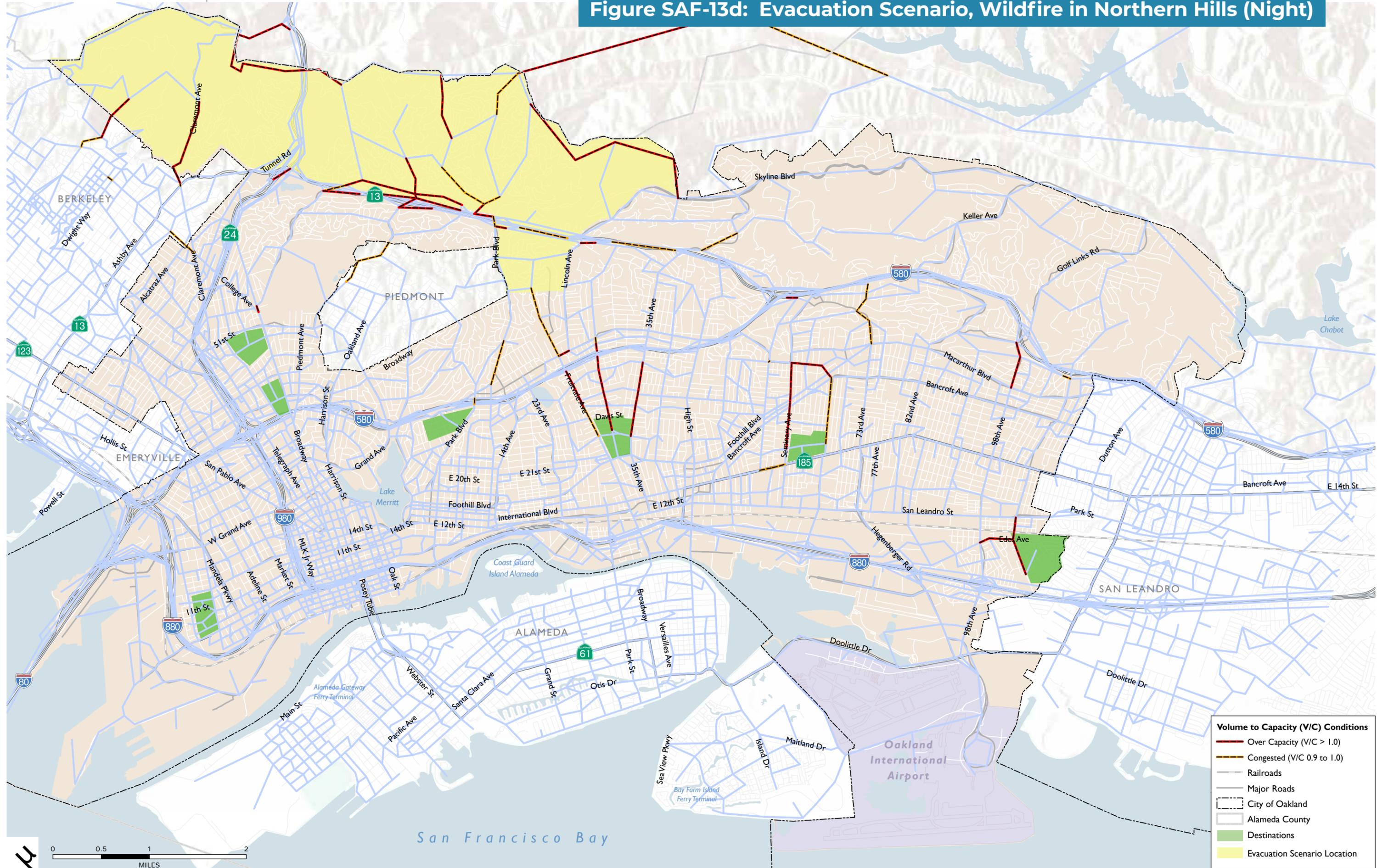
SOURCE: City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2021

**Figure SAF-13c: Evacuation Scenario, Wildfire in Northern Hills (PM Peak Traffic)**



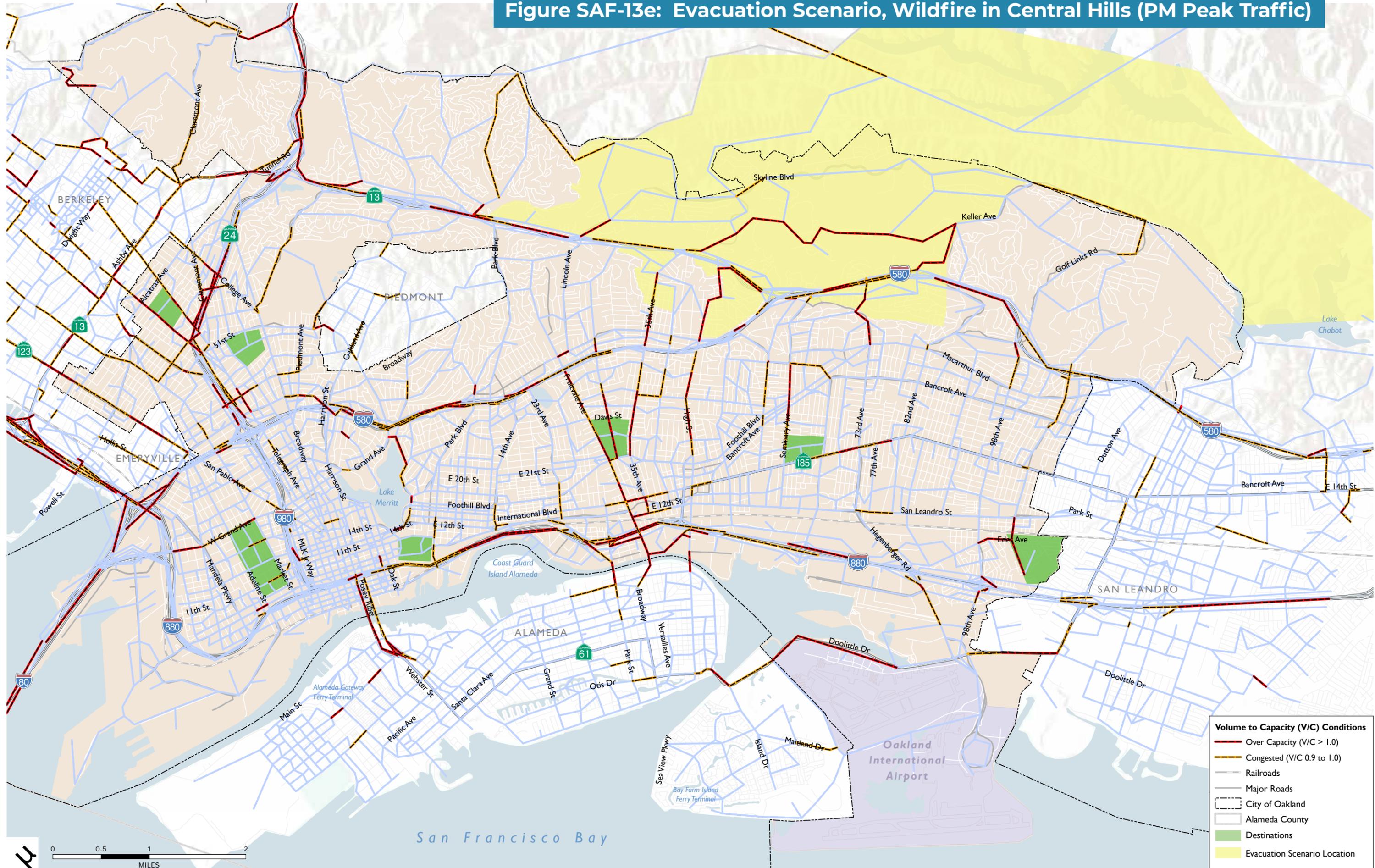
SOURCE: Kittelson & Associates, 2023; City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2023

Figure SAF-13d: Evacuation Scenario, Wildfire in Northern Hills (Night)



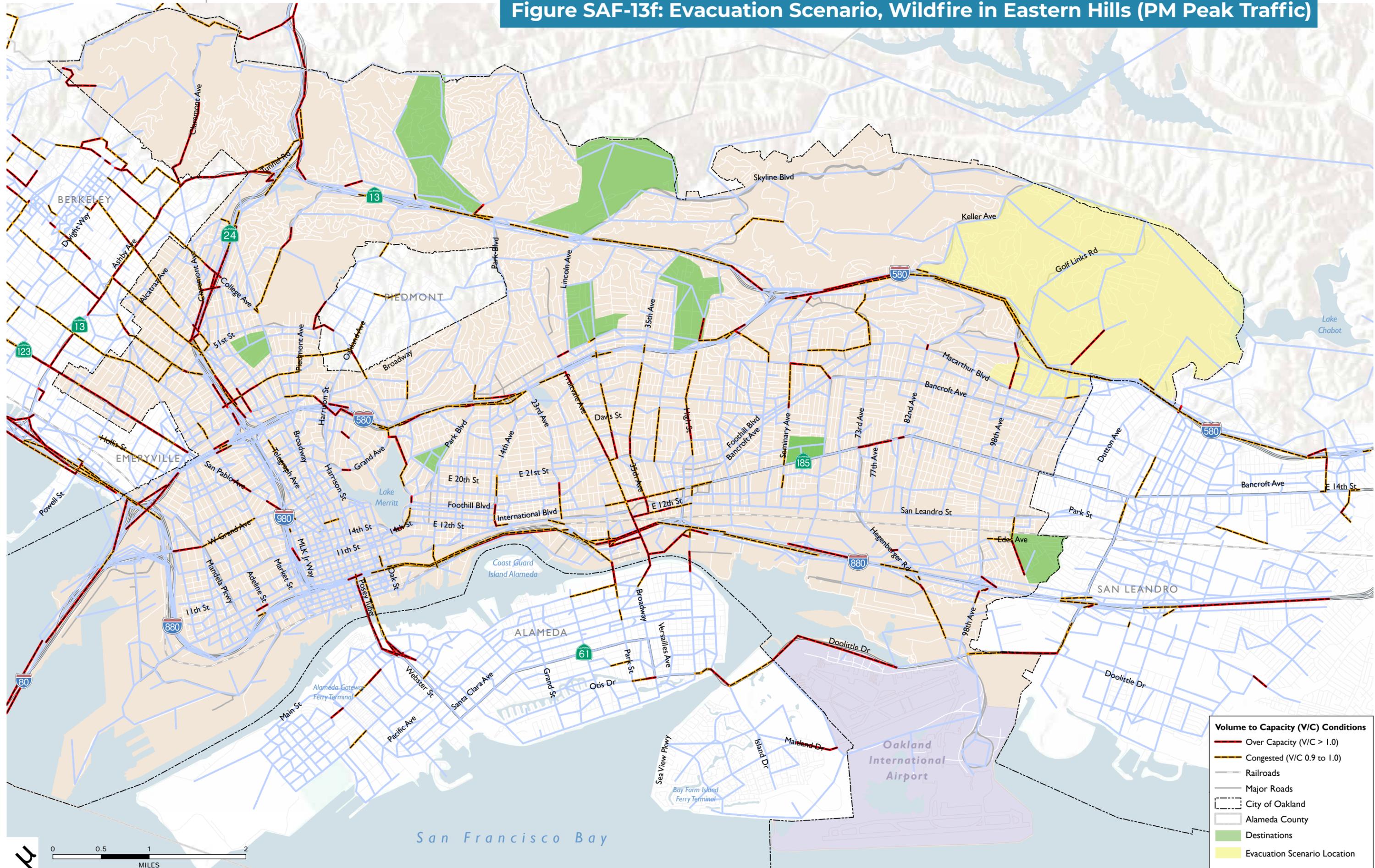
SOURCE: Kittelson & Associates, 2023; City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2023

**Figure SAF-13e: Evacuation Scenario, Wildfire in Central Hills (PM Peak Traffic)**



SOURCE: Kittelson & Associates, 2023; City of Oakland, 2021; ALAMEDA County GIS, 2021; Dyett & Bhatia, 2023

**Figure SAF-13f: Evacuation Scenario, Wildfire in Eastern Hills (PM Peak Traffic)**



### Vulnerable Populations

Individuals who cannot afford access to private transportation and services such as hotels may be disadvantaged during emergency evacuation events. Approximately 15 percent of Oakland’s households lack access to a household vehicle and may be at greater risk of harm because they lack the capacity to evacuate.<sup>10</sup> It should be noted that this statistic does not reflect a complete picture of vulnerability during emergency evacuation; personal vehicle ownership is tied to a variety of factors that vary across income levels. Low-income residents who cannot afford personal vehicles may be less likely to live in neighborhoods that are served by a variety of transit amenities. Alternatively, moderate- and high-income residents may be more likely to live in neighborhoods well-connected by transit and choose not to own personal vehicles in spite of their ability to afford them. Homeowners who are underinsured may also be at risk-- increasingly, homes in high-fire-risk areas and high-flood-risk areas have fewer options for companies that will insure them, and higher premiums, making it harder to rebuild in cases of disaster.

While the Oakland Police, Fire, and Transportation departments are the primary agencies responsible for emergency evacuation operations, community programs like Communities of Oakland Respond to Emergencies (CORE) can help equip residents with the tools to provide additional mutual aid, resources, and support during emergencies, particularly in harder-to-reach neighborhoods. Beyond the CORE program, additional partnerships with community-based organizations may help expand the City’s evacuation transportation options during emergency events.

### CAPITAL IMPROVEMENT NEEDS

The backlog of maintenance and limited financial resources has resulted in a growing list of capital needs throughout the City. A number of these unfunded capital improvement needs are related to emergency preparedness and response, such as emergency services facilities. As the Oakland 2021-2023 Capital Improvement program details, there are several capital projects for which a funding source is not presently known, including projects that replace or renovate assets that are either structurally or functionally obsolete or have deferred maintenance issues.

<sup>10</sup> US Census Bureau ACS 5-year 2016-2020

Currently, the Police Administration Building and certain fire stations do not meet the mandate of essential service facilities (fully operational after an earthquake or similar disaster) or have significant deferred maintenance items that impact their operational status. Fire station facility improvements, described by departments as urgent, are considered critically unfunded; a 2021 informational report indicated approximately 25 stations and one training center were in need of maintenance.

One station targeted for priority replacement is Fire Station 4. Since 2019, the City has been searching for a viable site for relocation of Fire Station 4. Located at 1235 International Boulevard and designed in 1909, Fire Station 4 is one of the oldest public buildings in the city. It is also one of the busiest, responding to nearly 4,000 calls a year, with one Fire Engine and one Ladder truck. Currently, the station does not meet modern fire service, accessibility, or occupational safety standards. A modern replacement station will help better serve the community and improve public health and safety. Fire Station 4 is currently unfunded; it is estimated that land acquisition will cost \$9 million, and cost for the facility is \$25 million.

Another station targeted for priority replacement is Fire Station 29. The City is currently engaged with the community in a master

planning process for a new state-of-the-art fire station, fire training center and community complex located at 905 66th Avenue. The relocation of Fire Station 29 to this site is a top priority to replace the existing aging and outdated station at 10166 66th Avenue. The new Fire Station 29 facility will be funded by the City’s Measure KK Infrastructure Bond (see Table SAF-7), and built in the first phase of the site master plan. The new Fire Station will include a community room and classroom.

The overall Master Plan for Fire Station 29’s new location at 905 66th Avenue will include relocation of the obsolete OFD fire training facilities, fire training classrooms, Support Services Division and the Urban Search and Rescue Task Force #4 (USAR) Warehouse. A portion of the site will be dedicated to a community-oriented business or facility to be determined through an inclusive planning and community engagement process.

**Table SAF-7** lists capital improvements for the Oakland Fire Department and Police Department funded by the Measure KK Infrastructure Bond.

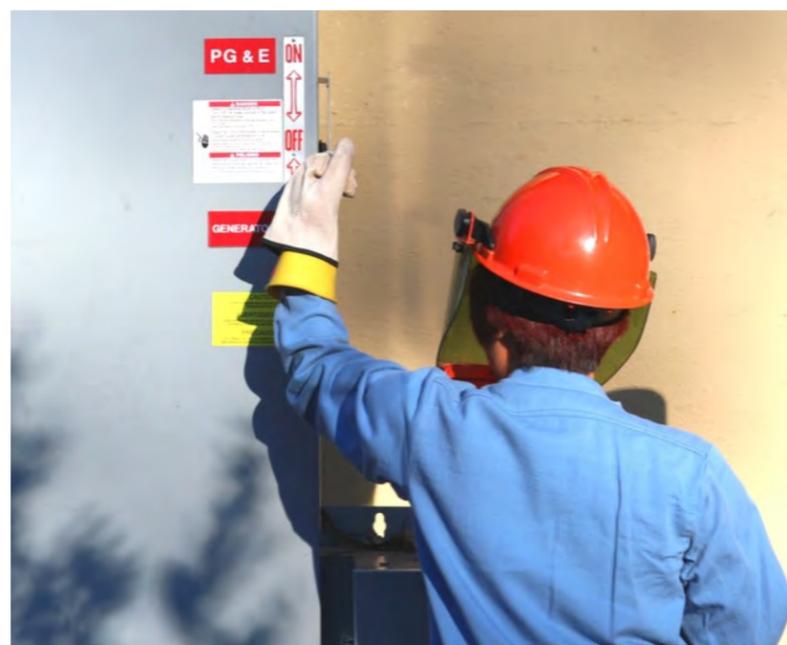
As noted previously, access to internet and online information plays a critical role in modern emergency response operations and communications. It is estimated that 94,000 residents in

**Table SAF-7: Police and Fire Station Capital Improvement Projects funded by Measure KK Infrastructure Bond**

STATION	PURPOSE	BUDGET		
		FY 2021-22	FY 2022-23	FY 2021-23
Fire Station #20	Repaving	0	\$1,000,000	\$1,000,000
Fire Station #29	New Station & Training Resiliency	0	\$14,000,000	\$14,000,000
Fire Station #6	Building Shell Repair	0	\$645,000	0
Fire Station #7	Structural Assessment	\$652,500	0	\$652,500
Fire Stations #13, #15, #17	HVAC Replacement	0	\$815,625	\$815,625
Eastmont Police Station	Security Improvements	\$655,500	0	\$655,500

Source: City of Oakland, CA, FY 2021-23 Adopted Capital Improvement Program. Revised July 9, 2021

Oakland currently don't have access to the internet, barring them from emergency communications information shared digitally. The OakWiFi Initiative provides free wireless internet to Oakland residents to help close the digital divide at access points throughout the city. The OakWifi Initiative is listed in the 2021-2023 Capital Improvements program as an unfunded capital improvement with an anticipated cost of \$20,000,000.



## GOALS AND POLICIES

**GOAL SAF-8: MAINTAIN AN EMERGENCY PREPAREDNESS AND RESPONSE NETWORK THAT KEEPS ALL OAKLANDERS INFORMED, CONNECTED, AND SAFE BEFORE, DURING, AND AFTER AN EMERGENCY.**

### Emergency Preparedness

**SAF-8.1 Emergency Response.** Maintain and enhance the City's capacity for emergency response, fire prevention, and fire-fighting.

**SAF-8.2 Emergency Services Review.** Continue to engage the Police and Fire departments in the development review process to ensure that projects are designed and operated in a manner that minimizes the potential for public safety and fire hazards and maximizes the potential for responsive police and fire services.

**SAF-8.3 Hazard and Management Plans.** Maintain and update as necessary the Oakland Emergency Operations Plan, Annex of Emergency Support Functions, and Integrated Preparedness Plans, which describes how the City will prepare for, prevent, respond to, recover from and mitigate the effects of all types of hazard and threats. Incorporate EOP policy recommendations for terrorism and public health crises as part of these documents' future planning cycles.

**SAF-8.4 Data-Driven Equity Approach.** To support implementation of and future updates to the City's Local Hazard Mitigation Plan, and other safety-related plans, utilize the best available local data to identify racial disparities in the City of Oakland that can be used by the City to rank risk and prioritize mitigation strategies that incorporate a racial equity lens.

**SAF-8.5 Cohesive Evacuation Routes Network.** Ensure the evacuation routes network is interconnected with

adequate capacity and reflects ability to evacuate for multiple threats.

- Maintain adequate capacity along evacuation routes through methods such as limiting street parking where capacity may be needed.
- Maintain a higher level of tree and vegetation maintenance along evacuation routes and remove flammable trees adjacent to these routes.

### Power Loss

**SAF-8.6 Emergency Power.** Participate in East Bay Community Energy's Critical Municipal Facility program with the goal of increasing resilience to power losses, including Public Safety Power Shutoffs (PSPS), and climate-driven extreme weather events for low income, medically dependent, and elderly populations through installation of renewable energy and onsite energy storage with islanding capabilities (such as microgrids).

### Equitable Response, Notifications, and Preparedness Training

**SAF-8.7 Local Hazard Mitigation Plan.** To comply with federal and state law, follow and annually update the Oakland Local Hazard Mitigation Plan. Use the LHMP to guide mitigating actions to protect the whole community and environment from natural and humanmade hazards.

**SAF-8.8 Risk Reduction Models.** Integrate new risk reduction models (such as sea level rise modeling, wildfire mapping tools, etc.), tools, and methods into existing plans such as the General Plan, neighborhood and area plans, green infrastructure planning processes, etc., as may be appropriate.

**SAF-8.9 Community Training and Awareness.** Continue to offer community training on emergency prevention, preparedness and response as part of the CORE program. Partner with community organizations to target harder-to-reach populations, such as the unhoused, or linguistically isolated populations.

### Infrastructure Resilience/Resilience Hubs

**SAF-8.10 Public Facilities for Resilience & Relief.** Prioritize capital improvements and maintenance of public facilities such as fire stations, libraries, senior centers, cultural centers, parks, and recreation centers to ensure that they can function as essential service facilities, respite centers, and local assistance centers providing emergency social and medical services in times of distress (cooling and clean air stations, free air filtration mask distribution, food and vaccine distribution, clean water, testing centers, evacuation/disaster shelters, etc.), and as resilience hubs that empower communities to build resilience. Clean energy microgrids should be prioritized at all community-serving facilities that are deemed critical during emergency events. In alignment with the ECAP, a minimum of three resilience hubs will be constructed in frontline communities by 2030. The City will continue pursuing resources to increase the number of resilience hubs beyond the minimum required, and to ensure that all frontline community members have access to a Resilience Hub.

**SAF-8.11 Critical Facilities Locations.** Locate critical facilities, such as hospitals and health care facilities, emergency shelters, fire stations, police stations, emergency command centers, and other emergency service facilities and utilities so as to minimize exposure to flooding, seismic, geologic, wildfire, and other hazards, except those facilities that provide frontline access, such as fire stations in areas of fire hazard. If critical facilities must be located in hazard zones, require building construction and materials that minimize hazard, safe access for emergency response vehicles, visible street signs, and adequate infrastructure for emergency scenarios, such as flooding, backup power and water supplies.

**SAF-8.12 Critical Facilities Funding.** Continue to explore funding sources for capital improvements necessary for emergency response, with priority given for fire station improvements.

**SAF-8.13 Facilities and Climate Impacts.** Consider climate impacts, risk, and uncertainty in designing and evaluating capital improvement program design and adjust infrastructure design standards and project locations to address asset- and site-specific vulnerabilities.

**SAF-8.14 Heat Pumps.** Equip community-serving facilities with heat pumps instead of energy-intensive air conditioning units. Prioritize community-serving facilities in neighborhoods with a high urban heat island index and higher social vulnerability.

### Alerts and Evacuation

**SAF-8.15 Emergency Notification.** Use early warning notification systems (Zonehaven, text messages, etc.) to notify residents by wireless emergency alert of the need to evacuate in the event of an emergency and the location of evacuation routes, points, and critical facilities such as schools and day care centers, particularly residents of vulnerable areas and neighborhoods with constrained emergency access. Continue to collaborate with adjoining jurisdictions on the network of outdoor warning sirens, and to test the sirens on a monthly basis.

**SAF-8.16 Traffic Signaling.** Prioritize the connection of traffic signals along evacuation routes to the City's Traffic Management Center to allow for real-time modifications to signal timing that can speed evacuation in the event of an emergency.

**SAF-8.17 Priority Route Coordination.** Partner with Caltrans and neighboring jurisdictions on measures to protect critical evacuation routes and work with local agencies to develop contingency plans that address disconnected routes and explore roadway improvements that can provide better emergency access under emergency evacuation scenarios. Work with emergency response teams and transit providers to identify and support Oakland residents without access to transportation in the event of an emergency.



# 5. Goals, Policies, and Implementation Measures

POLICY	ACTION
<b>GOAL SAF-1: MINIMIZE THE RISK TO LIFE AND PROPERTY CAUSED BY SEISMIC AND GEOLOGIC HAZARDS.</b>	
<p><b>SAF-1.1 Seismic Hazards.</b> Develop and continue to enforce and carry out regulations and programs to reduce seismic hazards and hazards from seismically triggered phenomena. Prioritize programs in areas of highest seismic risk and seismic vulnerability.</p>	<p><b>SAF-A.1</b> Continue to require site-specific geologic reports for development proposals in the Hayward Fault Special Studies Zone, or Zones of Required Investigation, as shown in <b>Figure SAF-1</b>. Restrict development within 50 feet of the fault trace.</p>
<p><b>SAF-1.2 Structural Hazards.</b> Continue, enhance or develop regulations and programs designed to minimize seismically related structural hazards from new and existing buildings.</p>	<p><b>Responsibility:</b> Planning &amp; Building <b>Timeframe:</b> Ongoing</p>
<p><b>SAF-1.3 Limit Development in Hazardous Areas and Minimize Erosion.</b> Minimize threat to structures and humans by limiting development in areas subject to landslides or other geologic threat and undertake efforts to limit erosion from new development.</p>	<p><b>SAF-A.2</b> Ensure on a continual basis that the City’s geologic-hazard mapping is up-to-date.</p> <p><b>Responsibility:</b> Planning &amp; Building <b>Timeframe:</b> Ongoing</p>
<p><b>SAF-1.4 Seismic Hazard Coordination.</b> Work with other public agencies to reduce potential damage from earthquakes to “lifeline” utility, economic, and transportation systems, including Caltrans; BART; PG&amp;E, EBMUD, and other utilities providers, the Port of Oakland, and others.</p>	<p><b>SAF-A.3</b> Regulate development by slope categories and continue to enforce provisions that require geotechnical reports and soil hazards investigations be made in areas prone to landslides as shown in <b>Figure SAF-2</b> as part of project proposals.</p> <p><b>Responsibility:</b> Planning &amp; Building <b>Timeframe:</b> Ongoing</p>
	<p><b>SAF-A.4</b> Continue to enforce ordinances for grading, erosion, and sedimentation; provisions under the creek protection, storm water management and discharge control ordinance; and regulations for site-design and source control techniques for peak storm-water runoff flows and landslide and erosion impacts from increased runoff volumes as shown in <b>Figure SAF-2</b>.</p> <p><b>Responsibility:</b> Planning and Building for project requiring permits, including Creek Protection Permits, Public Works, Watershed and Stormwater Management Division for non-permitted work. <b>Timeframe</b> Ongoing</p> <p><b>SAF-A.5</b> Design fire-preventive vegetation-management techniques and practices for creeksides and high-slope areas that align with practices designed to stabilize hillsides, prevent erosion and sedimentation to help prevent landslide and erosion hazards.</p> <p><b>Responsibility:</b> Fire Department, Public Works <b>Timeframe:</b> Medium</p> <p><b>SAF-A.6</b> Continue implementation of the Mandatory Soft Story Retrofit Program and explore expansion of the retrofit program to include buildings with non-ductile concrete construction. Invest in and seek grant funding to support the seismic retrofit structures within the city, prioritizing socially vulnerable neighborhoods shown in <b>Figure SAF-1</b>. Within these areas, prioritize low-income homeowners and landlords that provide affordable housing.</p> <p><b>Responsibility:</b> Planning &amp; Building, Housing and Community Development <b>Timeframe:</b> Ongoing</p>

POLICY	ACTION
<p><b>GOAL SAF-2: PROACTIVELY PREVENT URBAN FIRES AND EXPOSURE TO WILDFIRE AND PROTECT COMMUNITY MEMBERS AND PROPERTY FROM FIRE DANGER.</b></p>	
<p><b>SAF-2.1 Structural Fires.</b> Continue, enhance, or implement programs that seek to reduce the risk of structural fires. Prioritize programs in frontline communities at highest seismic and fire risk.</p>	<p><b>SAF-A.7</b> Undertake a program to reduce fire load in VHFHSZ, such as through removal of non-native, highly combustible trees such as eucalyptus in fire susceptible areas. Consider methods—such as establishment of a progressive special vegetation management zone fees—to provide ongoing revenue for additional efforts for vegetation management.</p> <p><b>Responsibility:</b> Fire Department <b>Timeframe:</b> Medium</p>
<p><b>SAF-2.2 Vegetation and Urban Forest Management.</b> Manage vegetation and the urban forest to reduce combustible load, erosion, and other risks exacerbated by climate change.</p> <ul style="list-style-type: none"> <li>• Adopt and fully implement a Vegetation Management Plan for high-fire risk areas. Continue to update and enforce the Oakland Fire Code to require building owners in high-risk areas to maintain defensible space and implement fire prevention measures. As part of the Vegetation Management Plan, consult, contract with, and fairly compensate Indigenous groups with expertise in using cultural burning and other traditional ecological management and fire suppression techniques.</li> <li>• Implement the Urban Forest Master Plan, a comprehensive, area-wide urban canopy and vegetation plan that identifies locations where trees can be added and maintained, such as parks, streets, and rights-of-way. As a follow-up action, proactively address soil sequestration of carbon and water in frontline communities most affected by wildfire and other climate risks. See <i>Environmental Justice Element policy EJ-6.16 for other urban forest objectives.</i></li> </ul>	<p><b>SAF-A.8</b> Adopt and amend as needed updated versions of the California building and fire codes and local housing code so that optimal fire-protection standards are used in construction and renovation projects. Projects in Very High Fire Hazard Severity zones and the Wildland Urban Interface are required to include higher fire-rated construction.</p> <p><b>Responsibility:</b> Planning &amp; Building <b>Timeframe:</b> Medium</p> <p><b>SAF-A.9</b> Continue to review development proposals to ensure that they incorporate required and appropriate fire-mitigation measures, including adequate provisions for occupant evacuation, and access by fire-fighting personnel and equipment.</p> <p><b>Responsibility:</b> Planning &amp; Building, Fire Department <b>Timeframe:</b> Ongoing</p>

POLICY	ACTION
<p><b>SAF-2.3 Development in the Very High Fire Hazard Severity Zone (VHFHSZ).</b> Prioritize development in areas with existing adequate road networks, evacuation routes, and water infrastructure. Require any new development in the Very High Fire Hazard Severity Zone to prepare a Fire Protection Plan that minimizes risks by:</p> <ul style="list-style-type: none"> <li>• Assessing site-specific characteristics such as topography, slope, vegetation type, wind patterns etc.</li> <li>• Siting and designing development to avoid hazardous locations (e.g. through fire breaks) to the extent feasible.</li> <li>• Incorporating fuel modification and brush clearance techniques in accordance with applicable fire safety requirements and carried out in a manner which reduces impacts to environmentally sensitive habitat to the maximum feasible extent.</li> <li>• Using fire-resistant building materials and design features, such as visible signage, consistent with the adopted Municipal Code and Fire and Building Code standards.</li> <li>• Using fire-retardant, native plant species in landscaping.</li> <li>• Complying with established standards and specifications for fuel modification, defensible space, access, and water facilities.</li> <li>• Banning generators and fuel storage (e.g. for generators) in VHFHSZ.</li> <li>• Requiring street improvements to comply with minimum fire road access standards.</li> <li>• Disallowing new subdivisions in areas with less than two evacuation routes (as shown in <b>Figure SAF-13b</b>), unless a development were to be able to provide additional connections to ameliorate this condition.</li> </ul>	<p><b>SAF-A.10</b> Compile a list of high-rise and high-occupancy buildings which are deemed to be particularly susceptible to fire hazards, due to their age or construction materials. Determine an expeditious timeline for the fire safety inspection of all such structures. Prioritize areas and financial assistance for fire safety retrofits based on racial equity and vulnerability criteria, including lower income households, mobility-impaired residents, families with small children, and older adults.</p> <p><b>Responsibility:</b> Planning &amp; Building, Fire Department  <b>Timeframe:</b> Medium</p> <p><b>SAF-A.11</b> Continue to conduct periodic fire-safety inspections of commercial, multi-family, and institutional buildings. Prioritize inspections among areas at high risk and high vulnerability, including lower-income households, areas with greater percentages of mobility-impaired residents, families with small children, and older adults.</p> <p><b>Responsibility:</b> Planning &amp; Building, Fire Department  <b>Timeframe:</b> Ongoing</p>
<p><b>SAF-2.4 Slope-Density Regulations.</b> Reduce permitted development densities and intensities by slope tiers—such as between 15 and 30 percent slope, and greater than 30 percent slope—in hills/hillside areas. <i>This consideration would be reflected as part of the LUTE update.</i></p>	
<p><b>SAF-2.5 Financial Assistance.</b> In high hazard areas, identify or develop programs to provide financial incentives or assistance to low-income households without vehicles and mobility-impaired residents for defensible space maintenance, home hardening, and other measures to reduce risk.</p>	
<p><b>SAF-2.6 Agency Coordination.</b> Continue to participate not only in general mutual-aid agreements but also in agreements with adjoining jurisdictions and other public agencies for cooperative response to fires, including multi-jurisdictional programs and task forces.</p>	

POLICY	ACTION
<p><b>SAF-2.7 Protect against Smoke and Wildfire.</b> Improve access to better indoor air quality to protect against smoke and wildfire through methods such as requiring installation of MERV filters in new developments and identifying additional clean air centers and resilience spaces within residential areas.</p>	
<p><b>SAF-2.8 Water Infrastructure.</b> In partnership with EBMUD, plan for the ongoing maintenance and long-term integrity of planned and existing water supply infrastructure, including peak load water supply.</p>	
<p><b>GOAL SAF-3: PROTECT PEOPLE AND PROPERTY FROM FLOODING.</b></p>	
<p><b>SAF-3.1 Minimize Storm-Induced Flooding.</b> Continue or strengthen city programs that seek to minimize the storm-induced flooding hazard.</p>	<p><b>SAF-A.12</b> As part of creek “naturalization” or restoration efforts, undertake ecologically-sensitive solutions that align with integrated open space/flooding solutions where feasible. As staff resources are available, explore these solutions in partnership with community organizations, such as partners involved in the East Oakland Neighborhood Initiative, Save the Bay, Mycelium Youth, Shoreline Leadership Academy, and other groups already implementing climate-resilient solutions.</p> <p><b>Responsibility:</b> Public Works <b>Timeframe:</b> Ongoing</p> <p><b>SAF-A.13</b> Continue to provide sandbags and plastic sheeting to residents and businesses in anticipation of rainstorms, and to deliver those materials to people with disabilities and older adults upon request.</p> <p><b>Responsibility:</b> Public Works <b>Timeframe:</b> Ongoing</p> <p><b>SAF-A.14</b> Ensure that new construction and major improvements to existing structures within flood zones are in compliance with federal requirements and, thus, remain a participant in the National Flood Insurance Program (NFIP).</p> <p><b>Responsibility:</b> Public Works, Planning &amp; Building <b>Timeframe:</b> Short</p> <p><b>SAF-A.15</b> Continue to coordinate with FEMA, the Alameda County Flood Control and Water Conservation District, and the State Division of Safety of Dams on flood-control-related projects.</p> <p><b>Responsibility:</b> Public Works, Planning &amp; Building <b>Timeframe:</b> Ongoing</p>
<p><b>SAF-3.2 Storm-Induced Flooding Structural Risk.</b> Enforce and update local ordinances, and comply with regional orders, that would reduce the risk of storm-induced flooding.</p>	
<p><b>SAF-3.3 Reestablish Full Compliance and Good Standing Under the National Flood Insurance Program (NFIP).</b> The City will coordinate with FEMA Region IX and DWR to address all identified issues from the open September 2017 Community Assistance Visit (CAV) to reestablish the City’s full compliance and good standing under the NFIP.</p>	
<p><b>SAF-3.4 Flood Control Coordination.</b> Continue to coordinate with FEMA, the Alameda County Flood Control and Water Conservation District (ACFCWCD), and the State Division of Safety of Dams on flood-control-related projects.</p>	

POLICY	ACTION
<p><b>SAF-3.5 Green Stormwater Infrastructure.</b> Fund and implement a green infrastructure program for the installation and maintenance of projects and existing civic resources such as the parks system and public spaces, to improve stormwater management, support biodiversity, reduce air pollution exposure, improve water quality, and increase access to natural spaces, including trees. Prioritize green stormwater infrastructure investment in frontline communities, particularly in residential neighborhoods dominated by concrete and asphalt with limited green space and elevated air pollution, in Priority Conservation Areas, and in areas where green infrastructure, including trees and other types of vegetated buffers, can effectively address stormwater management issues and reduce air pollution exposure among sensitive populations. <i>This policy is cross-listed as Action EJ-A.13 in the Environmental Justice Element.</i></p>	
<p><b>GOAL SAF-4: PROACTIVELY PLAN FOR IMPACTS OF SEA LEVEL RISE ON PEOPLE, PROPERTY, AND ESSENTIAL INFRASTRUCTURE.</b></p>	
<p><b>SAF-4.1 Sea Level Rise and Community Engagement.</b> As recommended in the Sea Level Rise Roadmap and ECAP, develop a plan for organizations working to address sea level rise adaptation and building resilience of vulnerable communities. Work with communities to use community-generated data critical to future SLR mapping efforts.</p>	<p><b>SAF-A.16</b> Continue to repair, maintain, and make structural improvements to storm drains to enable them to perform to their design capacity in handling water flows.</p> <p><b>Responsibility:</b> Public Works, Planning &amp; Building <b>Timeframe:</b> Ongoing</p>
<p><b>SAF-4.2 Current Development and Sea Level Rise.</b> Use in planning and development reviews, as applicable, the best available science about projected sea level rise and other climate change-related environmental changes when addressing flooding, potential for groundwater contamination, and other hazards associated with sea level rise.</p>	<p><b>SAF-A.17</b> Work with property owners to develop cohesive areawide flooding prevention strategies in the two areas most susceptible to 100-year floods – the shoreline near the mouth of the Oakland Estuary, and the Coliseum and areas north extending through to the Flea Market.</p> <p><b>Responsibility:</b> Public Works <b>Timeframe:</b> Short</p>
<p><b>SAF-4.3 New Development and Sea Level Rise.</b> Develop sea-level rise standards/horizon that will guide adaption and resiliency planning as part of the updated Sea Level Rise Roadmap, including recommendations and regulations for a suite of shoreline protection measures (including ecologically-friendly adaptation options), protective setbacks, and other adaptation strategies, to be incorporated into future development projects.</p>	<p><b>SAF-A.18</b> Study compounding impact of sea level rise on groundwater threats in areas with hazardous facilities. Comply with performance standards pursuant to the Alameda countywide National Pollutant Discharge Elimination System municipal stormwater permit.</p> <p><b>Responsibility:</b> Sustainability and Resilience Division, City Administrator’s Office, Planning &amp; Building, Public Works <b>Timeframe:</b> Short</p>
<p><b>SAF-4.4 Sea Level Rise Vulnerability Assessment.</b> Require applicants proposing to develop in a future inundation area (as depicted in a SLR scenario to be determined in subsequent administrative regulations or documents) to conduct a Sea Level Rise vulnerability assessment for the project, prepare a Sea Level Rise Adaptation Plan for implementation as part of the project designs, and submit the assessment, adaptation plan, and conceptual design to the City for review and approval.</p>	<p><b>SAF-A.19</b> Continue to enforce the grading, erosion, and sedimentation ordinance and provisions under the creek protection, storm water management and discharge control ordinance to keep watercourses free of obstructions and protect drainage facilities.</p> <p><b>Responsibility:</b> Planning &amp; Building <b>Timeframe:</b> Ongoing</p>

POLICY	ACTION
<p><b>SAF-4.5 Evaluating Bay/Watershed Flooding Potential.</b> In partnership with other agencies, including the Port of Oakland, the Bay Area Bay Conservation and Development Commission, and the ACFCWCD, re-evaluate both Bay flooding and watershed flooding potential at key milestones in the Safety Element’s implementation horizon, to manage for changing sea level rise projections.</p>	<p><b>SAF-A.20</b> By 2025, conduct a regional and citywide community engagement effort to determine planning thresholds and appropriate sea level rise mitigation strategies.</p> <p><b>Responsibility:</b> Sustainability and Resilience Division, City Administrator’s Office, Planning &amp; Building  <b>Timeframe:</b> Short</p>
<p><b>SAF-4.6 Sea Level Rise Regional Strategy.</b> As part of the Sea Level Rise Roadmap update, continue to work with regional entities to address rising water levels in the San Francisco Bay and coordinate with the City’s other climate adaptation efforts.</p>	
<p><b>GOAL SAF-5: MINIMIZE HEALTH AND SAFETY IMPACTS RELATED TO THE USE, STORAGE, MANUFACTURE, AND TRANSPORT OF HAZARDOUS MATERIALS.</b></p>	
<p><b>SAF-5.1 Risks from Hazardous Materials Facilities.</b> Review proposed facilities that would produce or store hazardous materials, gas, natural gas, or other fuels to identify, and require feasible mitigation for, any significant risks. The review shall consider, at a minimum, the following:</p> <ul style="list-style-type: none"> <li>• Presence of seismic or geologic hazards;</li> <li>• Presence of other hazardous materials;</li> <li>• Proximity to residential development and areas in which substantial concentrations of people exist, particularly Environmental Justice communities already overburdened by pollution, including toxic releases from facilities, cleanup sites, groundwater threats/ threats from sea level rise, and other sources; and</li> <li>• Nature and level of risk and hazard associated with the proposed project.</li> </ul>	<p><b>SAF-A.21</b> As part of the LUTE, the City of Oakland will include policy recommendations from the West Oakland Truck Management Plan. These include: 1) traffic calming measures to keep truck traffic off residential streets; 2) improved signage regarding existing truck routes; 3) preferred routes to use when destinations are not located on truck routes; and 3) modifications to truck routes and prohibited streets.</p> <p><b>Responsibility:</b> Planning &amp; Building, OakDOT  <b>Timeframe:</b> Short</p> <p><b>SAF-A.22</b> Continue to coordinate with ACDEH, the unified-program agency responsible for issuance of permits for and inspection of certain industrial facilities, monitoring the filing of disclosure forms and risk-management plans, hazardous-materials assessment reports and remediation plans, and closure plans by such facilities.</p> <p><b>Responsibility:</b> Public Works , Planning &amp; Building  <b>Timeframe:</b> Ongoing</p> <p><b>SAF-A.23</b> Continue to rely on, and update, the City’s hazardous materials area plan to respond to emergencies related to hazardous materials.</p> <p><b>Responsibility:</b> Emergency Management Services Division, Fire Department  <b>Timeframe:</b> Ongoing</p> <p><b>SAF-A.24</b> Continue to offer basic emergency-response education and training to local businesses.</p> <p><b>Responsibility:</b> Emergency Management Services Division, Fire Department  <b>Timeframe:</b> Ongoing</p>
<p><b>SAF-5.2 Hazardous Materials.</b> Minimize the potential risks to human and environmental health and safety associated with the past and present use, handling, storage and disposal of hazardous materials.</p>	
<p><b>SAF-5.3 Site Contamination.</b> Through enforcement of standard conditions of approval, ensure buildings and sites are or have been investigated for the presence of hazardous materials and/or waste contamination before development or if there is reason to believe an existing building or site may contain hazardous materials that pose a threat to possible users. Continue to require remediation and construction techniques for adequate protection of construction workers, future occupants, adjacent residents, and the environment are adequately protected from hazards associated with contamination.</p>	

POLICY	ACTION
<p><b>SAF-5.4 Hazardous Materials Accidents.</b> Seek to prevent industrial and transportation accidents involving hazardous materials, and enhance the City’s capacity to respond to such incidents. Continue to enforce regulations limiting truck travel through certain areas of the city to designated routes and consider updating OMC 10.52.010 to establishing time-based restrictions on truck travel on certain routes to reduce the risk and potential impact of accidents during peak traffic hours.</p>	<p><b>SAF-A.25</b> Continue to participate in the Alameda County Waste Management Authority and, as a participant, continue to implement policies under the county’s hazardous-waste management plan to properly dispose of hazardous wastes.</p> <p><b>Responsibility:</b> Environmental Services Division, Public Works  <b>Timeframe:</b> Ongoing</p>
<p><b>SAF-5.5 Study Options to Provide Financing for the Remediation of Environmentally Contaminated Sites, with Priority for Affordable Projects.</b> As grant and loan funding sources are secured, support property owners through technical assistance and financing of characterization and/or remediation of environmentally contaminated sites.</p>	<p><b>SAF-A.26</b> Continue to apply for and manage EPA or other federally grants for the cleanup of Brownfield sites.</p> <p><b>Responsibility:</b> Public Works, Economic &amp; Workforce Development Dept.  <b>Timeframe:</b> Ongoing</p> <p><b>SAF-A.27</b> Outreach and engage with the Alameda County Department of Environmental Health, California Department of Toxic Substances Control, and the Regional Water Resources Control Board to ensure the public has access to a database with detailed site information on all brownfields and contaminated sites in the city and the existing restrictions placed on those sites.</p> <p><b>Responsibility:</b> Environmental Services Division, Public Works  <b>Timeframe:</b> Ongoing</p>

POLICY	ACTION
<b>GOAL SAF-6: PROTECT OAKLANDERS FROM AIRPORT LAND USE HAZARDS.</b>	
<p><b>SAF-6.1 ALUCP Updates.</b> Periodically review and coordinate with the Oakland Airport Land Use Commission on updates and modifications to ALUCPs conducted for airport facilities within Alameda County.</p>	<p><b>SAF-A.28</b> Incorporate land use compatibility considerations in LUTE as part of Phase 2.</p> <p><b>Responsibility:</b> Planning &amp; Building <b>Timeframe:</b> Short</p>
<p><b>SAF-6.2 Land Use Compatibility.</b> Require land uses surrounding the Oakland International Airport to be compatible with the operation of the airport and restrict development of potentially hazardous obstructions or other hazards to flight. Discourage uses that may impact airport operations or do not meet Federal or State aviation standards.</p>	
<b>GOAL SAF-7: FOSTER FEELINGS OF SAFETY IN ALL OAKLAND NEIGHBORHOODS.</b>	
<p><b>SAF-7.1 Reimagining Public Safety.</b> Support recommendations made in Oakland’s Reimagining Public Safety program, including through land use policies that promote more housing, living wage jobs, revitalization of commercial corridors, improved access to healthy food facilities, restorative justice centers, civic engagement, and arts and culture.</p>	<p><b>SAF-A.29</b> Work with community groups to ensure CPTED guidelines account for unique neighborhood and cultural considerations. Include representation from youth and formerly incarcerated individuals.</p> <p><b>Responsibility:</b> Planning &amp; Building <b>Timeframe:</b> Medium</p>
<p><b>SAF-7.2 Crime Prevention Through Environmental Design.</b> Continue to apply Crime Prevention through Environmental Design principles in the design of new development and encourage the provision of adequate public lighting; windows overlooking streets or parking lots; and paths to increase pedestrian activity within private development projects and public facilities in order to enhance public safety and reduce calls for service.</p>	

POLICY	ACTION
<p><b>GOAL SAF-8: MAINTAIN AN EMERGENCY PREPAREDNESS AND RESPONSE NETWORK THAT KEEPS ALL OAKLANDERS INFORMED, CONNECTED, AND SAFE BEFORE, DURING, AND AFTER AN EMERGENCY.</b></p>	
<p><b>SAF-8.1 Emergency Response.</b> Maintain and enhance the City's capacity for emergency response, fire prevention, and fire-fighting.</p>	<p><b>SAF-A.30</b> Maintain adequate capacity along evacuation routes as shown in SAF-11, e.g., by limiting street parking where capacity may be needed.</p> <p><b>Responsibility:</b> OakDOT <b>Timeframe:</b> Ongoing</p>
<p><b>SAF-8.2 Emergency Services Review.</b> Continue to engage the Police and Fire departments in the development review process to ensure that projects are designed and operated in a manner that minimizes the potential for public safety and fire hazards and maximizes the potential for responsive police and fire services.</p>	<p><b>SAF-A.31</b> Maintain a higher level of tree and vegetation maintenance along evacuation routes and remove flammable trees and others that could fall and block access adjacent to these routes.</p> <p><b>Responsibility:</b> Fire Department <b>Timeframe:</b> Ongoing</p>
<p><b>SAF-8.3 Hazard and Management Plans.</b> Maintain and update as necessary the Oakland Emergency Operations Plan, Annex of Emergency Support Functions, and Integrated Preparedness Plans, which describes how the City will prepare for, prevent, respond to, recover from and mitigate the effects of all types of hazard and threats. Incorporate EOP policy recommendations for terrorism and public health crises as part of these documents' future planning cycles.</p>	<p><b>SAF-A.32</b> As part of the LUTE update, project future emergency service needs for planned land uses and evaluate capital improvement and staffing plans accordingly.</p> <p><b>Responsibility:</b> Public Works, Planning &amp; Building <b>Timeframe:</b> Short</p>
<p><b>SAF-8.4 Data-Driven Equity Approach.</b> To support implementation of and future updates to the City's Local Hazard Mitigation Plan, and other safety-related plans utilize the best available local data to identify racial disparities in the City of Oakland that can be used by the City to rank risk and prioritize mitigation strategies that incorporate a racial equity lens.</p>	<p><b>SAF-A.33</b> Periodically assess the need for new or relocated fire stations, facilities, programs, and technologies.</p> <p><b>Responsibility:</b> Public Works <b>Timeframe:</b> Ongoing</p> <p><b>SAF-A.34</b> Strive to meet a goal of responding to fires and other emergencies within seven minutes of notification 90 percent of the time.</p> <p><b>Responsibility:</b> Fire Department <b>Timeframe:</b> Ongoing</p> <p><b>SAF-A.35</b> Continue to participate in multi-jurisdictional programs and task forces, such as the Hills Emergency Forum and Diablo FireSafe Council, that work to reduce the threat of wildfires.</p> <p><b>Responsibility:</b> Fire Department, Fire Prevention Bureau <b>Timeframe:</b> Ongoing</p> <p><b>SAF-A.36</b> Implement at least three resilience hubs, including in West Oakland, East Oakland, and at the Lincoln Square Recreation Center.</p> <p><b>Responsibility:</b> Sustainability and Resilience Division of the City Administrator's Office, Public Works <b>Timeframe:</b> Short</p>

POLICY	ACTION
<p><b>SAF-8.5 Cohesive Evacuation Routes Network.</b> Ensure the evacuation routes network is interconnected with adequate capacity and reflects ability to evacuate for multiple threats.</p> <ul style="list-style-type: none"> <li>• Maintain adequate capacity along evacuation routes through methods such as limiting street parking, where capacity may be needed.</li> <li>• Maintain a higher level of tree and vegetation maintenance along evacuation routes and remove flammable trees adjacent to these routes.</li> </ul>	<p><b>SAF-A.37</b> Identify ways the City can help support decentralized community facilities to serve residents unable to travel to centralized resilience hubs.</p> <p><b>Responsibility:</b> Sustainability and Resilience Division, City Administrator’s Office, Public Works  <b>Timeframe:</b> Ongoing</p>
<p><b>SAF-8.6 Emergency Power.</b> Participate in East Bay Community Energy’s Critical Municipal Facility program with the goal of increasing resilience to power losses, including Public Safety Power Shutoffs (PSPS), and climate-driven extreme weather events for low income, medically dependent, and elderly populations through installation of renewable energy and onsite energy storage with islanding capabilities (such as microgrids).</p>	<p><b>SAF-A.38</b> In partnership with OakDOT, the Human Services Department, AC Transit, healthcare, and other community organizations, explore organization of a network to transport those without vehicles to these centralized resilience hubs during times of emergency. As part of the LUTE update in Phase 2, explore use of electrified buses as “mobile resilience centers”.</p> <p><b>Responsibility:</b> OakDOT, Human Services Department, Emergency Management Services Division, Planning &amp; Building  <b>Timeframe:</b> Short</p>
<p><b>SAF-8.7 Local Hazard Mitigation Plan.</b> To comply with federal and state law, follow and annually update the Oakland Local Hazard Mitigation Plan. Use the LHMP to guide mitigating actions to protect the whole community and environment from natural and humanmade hazards.</p>	<p><b>SAF-A.39</b> Establish neighborhood-level communication networks to inform residents of the location and directions to the nearest cooling center and coordinate transportation to these centers for limited-mobility residents during extreme heat events.</p> <p><b>Responsibility:</b> Emergency Management Services Division  <b>Timeframe:</b> Ongoing</p>
<p><b>SAF-8.8 Risk Reduction Models.</b> Integrate new risk reduction models (such as sea level rise modeling, wildfire mapping tools, etc.), tools, and methods into existing plans such as the General Plan, neighborhood and area plans, green infrastructure planning processes, etc., as may be appropriate.</p>	<p><b>SAF-A.40</b> Evaluate capital improvement projects in the Infrastructure and Facilities Element and LUTE in Phase 2 using climate impacts, risk, and uncertainty. Evaluate CIP projects as part of short- and long-term CIP reports.</p> <p><b>Responsibility:</b> Planning &amp; Building, Economic and Workforce Development, Public Works, OakDOT, Sustainability and Resilience Division, City Administrator’s Office, All Asset Owning Department  <b>Timeframe:</b> Short</p>
<p><b>SAF-8.9 Community Training and Awareness.</b> Continue to offer community training on emergency prevention, preparedness and response as part of the CORE program. Partner with community organizations to target harder-to-reach populations, such as the unhoused, or linguistically isolated populations.</p>	<p><b>SAF-A.41</b> Develop prioritized list of community-serving facilities and complete heat pump installation.</p> <p><b>Responsibility:</b> Public Works, Sustainability and Resilience Division, City Administrator’s Office  <b>Timeframe:</b> Medium</p>
<p><b>SAF-8.10 Public Facilities for Resilience &amp; Relief.</b> Prioritize capital improvements and maintenance of public facilities such as fire stations, libraries, senior centers, cultural centers, parks, and recreational centers to ensure that they can function as essential service facilities, respite centers, and local assistance centers providing emergency social and medical services in times of distress (cooling and clean air stations, free air filtration mask distribution, food and vaccine distribution, clean water, testing centers, evacuation/disaster shelters, etc.), and as resilience hubs that empower communities to build resilience. Clean energy microgrids should be prioritized at all community-serving facilities that are deemed critical during emergency events. In alignment with the ECAP, a minimum of three resilience hubs will be constructed in frontline communities by 2030. The City will continue pursuing resources to increase the number of resilience hubs beyond the minimum required, and to ensure that all frontline community members have access to a resilience hub.</p>	<p><b>SAF-A.42</b> Continue to collaborate with adjoining jurisdictions on the network of outdoor warning sirens, and to test the sirens on a monthly basis.</p> <p><b>Responsibility:</b> Emergency Management Services Division  <b>Timeframe:</b> Ongoing</p>

POLICY	ACTION
<p><b>SAF-8.11 Critical Facilities Locations.</b> Locate critical facilities, such as hospitals and health care facilities, emergency shelters, fire stations, police stations, emergency command centers, and other emergency service facilities and utilities so as to minimize exposure to flooding, seismic, geologic, wildfire, and other hazards, except those facilities that provide frontline access, such as fire stations in areas of fire hazard. If critical facilities must be located in hazard zones, require building construction and materials that minimize hazard, safe access for emergency response vehicles, visible street signs, and adequate infrastructure for emergency scenarios, such as flooding, backup power and water supplies.</p>	<p><b>SAF-A.43</b> Consider roadway improvements for better emergency access as part of the LUTE and identify any possible tradeoffs for everyday street safety.</p> <p><b>Responsibility:</b> Planning &amp; Building, OakDOT, Fire Department  <b>Timeframe:</b> Short</p> <p><b>SAF-A.44</b> Consider adoption of a disaster reconstruction overlay zone. As part of this action, explore funding sources and create a low-interest construction loan program for income-qualified owners who are recovering from a disaster. <i>This action is cross-referenced with 2023-2031 Housing Action Plan, Action 5.2.6.</i></p> <p><b>Responsibility:</b> Oakland Planning and Building  <b>Timeframe:</b> Medium</p>
<p><b>SAF-8.12 Facilities and Climate Impacts.</b> Consider climate impacts, risk, and uncertainty in designing and evaluating capital improvement program design and adjust infrastructure design standards and project locations to address asset- and site-specific vulnerabilities.</p>	
<p><b>SAF-8.13 Heat Pumps.</b> Equip community-serving facilities with heat pumps instead of energy-intensive air conditioning units. Prioritize community-serving facilities in neighborhoods with a high urban heat island index and higher social vulnerability.</p>	
<p><b>SAF-8.14 Emergency Notification.</b> Use early warning notification systems (Zonehaven, text messages, etc.) to notify residents by wireless emergency alert of the need to evacuate in the event of an emergency and the location of evacuation routes, points, and critical facilities such as schools and day care centers, particularly residents of vulnerable areas and neighborhoods with constrained emergency access. Continue to collaborate with adjoining jurisdictions on the network of outdoor warning sirens, and to test the sirens on a monthly basis.</p>	
<p><b>SAF-8.15 Traffic Signaling.</b> Prioritize the connection of traffic signals along evacuation routes to the City's Traffic Management Center to allow for real-time modifications to signal timing that can speed evacuation in the event of emergency.</p>	
<p><b>SAF-8.16 Priority Route Coordination.</b> Partner with Caltrans and neighboring jurisdictions on measures to protect critical evacuation routes and work with local agencies to develop contingency plans that address disconnected routes and explore roadway improvements that can provide better emergency access under emergency evacuation scenarios. Work with emergency response teams and transit providers to identify and support Oakland residents without access to transportation in the event of an emergency.</p>	

This page intentionally left blank.



**OAKLAND 2045**  

---

**GENERAL PLAN**